GARDNER: IS CANNIBALISM A MYTH? • FAIRY TALES • PSYCHIC FORECASTS FLOP AGAIN

Skeptical Inquirer

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Dermo-Optical Perception

A Scientific Test

Magnetic Water and Fuel Treatment

Myth, Magic, or Mainstream Science?

Dowsing the Rollrights

Anomalous Gold

Open Minds and the Argument from Ignorance

Psychic Exploitation

200% Probability and Beyond

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Skeptical Inquirer

January/February 1998 • VOL. 22, NO. 1

Book Review, *In Search of Planet Vulcan: The Ghost in Newton's Clockwork Universe*, p. 53

ARTICLES

21 **Testing New Claims of Dermo-Optical Perception**

Can blindfolded people really see through their skin? Two very reputable laboratories in Paris think they have obtained hard evidence to prove some subjects can. A team of scientists in Grenoble performs a critical experiment to ascertain the validity of this claim.

CLAUDIO BENSKI and SCIENTISTS from CRSSA

27 **Magnetic Water and Fuel Treatment: Myth, Magic, or Mainstream Science?**

Magnetic treatment has been claimed to soften water and improve the combustibility of fuels. A literature review reveals that these claims are not well supported by data.

MIKE R. POWELL

32 **Dowsing the Rollrights**

Dowsing may be one case of the phenomenon of "self as unrecognized cause." Other paranormal claims might originate in the same misperception.

P. A. HANCOCK

38 **Anomalous Gold**

"Ghost gold" eludes old-fashioned fire assaying but is snared by modern ghost-busting prospectors wielding doodle bugs.

K. R. BROWER

41 **Open Minds and the Argument from Ignorance**

Arguments from ignorance fallaciously infer that since a hypothesis has not been disproved, it is reasonable to believe that hypothesis or regard it with an open mind.

JONATHAN E. ADLER

45 **200% Probability and Beyond: The Compelling Nature of Extraordinary Claims in the Absence of Alternative Explanations**

The likelihood that people will accept any given proposed explanation of an unusual event—even one almost certainly wrong—is directly related to how few alternative explanations are accessible.

JOHN McDONALD

50 **Psychic Exploitation**

While some "psychics" represent a harmless form of entertainment or act as benign counselors, others knowingly hurt and con vulnerable clients. The authors recently investigated some of these individuals operating in London.

RICHARD WISEMAN and EMMA GREENING

How did the psychics fare in 1997? See p.6

COLUMNS

EDITOR'S NOTE 4

NEWS AND COMMENT
Fairy Tales: Film, Photos, Fantasies, and the Child Within Us / Psychic Forecasts Were a Big Flop (Again) / Diana's Death Eluded 'Psychics' / Australian Geologist Plimer's Costly Court Battle With Ark Creationists / ABC's *Good Morning America* Touts ESP, Psychokinesis, Astrology / First Issue of New Journal Examining Alternative Medicine Published / Californians Rate High-Tech, Scientists Highest Among All Institutions / CNBC Show Tackles Dennis Lee's Free-Energy Claims / CFI–Midwest's Inaugural Program a Success / Oh, the Dangers of Dihydrogen Monoxide / Skeptic in the News 5

NOTES OF A FRINGE-WATCHER
Is Cannibalism a Myth?
MARTIN GARDNER 14

INVESTIGATIVE FILES
Jesus Among the Clouds
JOE NICKELL 17

PSYCHIC VIBRATIONS
E-mailed Antigens and Iridium's Iridescence
ROBERT SHEAFFER 19

NEW BOOKS 56

ARTICLES OF NOTE 57

LETTERS TO THE EDITOR 59

GUIDE FOR AUTHORS 65

BOOK REVIEWS

In Search of Planet Vulcan: The Ghost in Newton's Clockwork Universe
by Richard Baum and William Sheehan
TERENCE HINES 53

Snowboarding to Nirvana
by Frederick Lenz
JOE SZIMHART 54

On the Cover: Can some people see without using their eyes? French scientists conduct a test, p.21. Photo by Tom Flynn.

EDITOR'S NOTE

This Seeing Is Not Believing

When I first read the manuscript of "Testing New Claims of Dermo-Optical Perception," the lead article in this issue, I was elated. French physicist Claudio Benski and a group of fellow scientists had carried out what I can only describe as the model of a serious scientific investigation of a paranormal claim.

You can decide for yourself. But there were several aspects I found commendable. First, the authors calmly outlined the problem. Although earlier assertions about dermo-optical perception—an alleged ability to "see" through the skin—had seemingly faded away, the authors describe how DOP is back and how a Russian company now is offering to train people in the technique. Two respected Paris laboratories even had concluded in 1996 that real perception by this means had been demonstrated. Obviously, independent confirmation was needed. Scientists from the Defense Medical Research Center of the French Ministry of Defense in Grenoble (CRSSA, in French) took up the challenge.

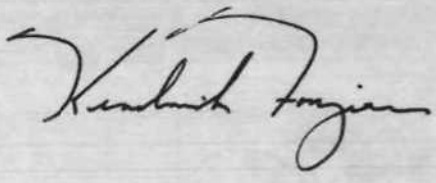
Second, the tests were carried out not in isolation by a single investigator but by a team of scientists. Science is a communal activity, and often a scientific group brings strengths to a study that one researcher acting alone cannot. Third, the lead investigator, Claudio Benski, was not just a physicist but—far more important in this instance—a trained conjurer. A conjurer's knowledge is highly relevant in such an investigation. Fourth, and most important, they followed the leads of Martin Gardner—whose classic article "Dermo-Optical Perception: A Peek Down the Nose" in *Science* (151: 654–657; 1966) is still worth rereading—and James Randi and established, in advance, a ten-point research protocol. The importance of doing so is crucial. The subject and the investigators formally agreed, prior to beginning, to all the conditions of the protocol, and it was agreed that the results would be published no matter the outcome. The reasoning behind all this is eloquently explained in the authors' article.

So too are the results, which are clearly presented for everyone to see. Readers can draw their own conclusions. Our pleasure in publishing this study is tempered by sadness. As we neared final production in November, we learned that Claudio Benski was hospitalized, suffering from chronic leukemia, which he had battled for some years. Eventually he got a laptop computer brought to his hospital bed and began returning messages. He made final corrections to his proofs in this way. On November 12, one of his friends, Guillermo Bomchil, e-mailed us the news that Claudio Benski had died that morning. He and other friends hoped the article was finished (it was) and ready for publication (it was in layout). His coauthors quickly followed with similar sentiments. Said Bomchil: "It would be a last homage to his rigorous thinking and his battle against irrationalism that was the backbone of his life."

* * *

This issue begins the fourth year in our new expanded format and bimonthly frequency. The larger size and greater frequency have brought unprecedented visibility to the SKEPTICAL INQUIRER. The number of subscribers—our regular, core readership we prize so highly—has increased by three thousand in recent months, and renewals, always strong, remain so. Thank you! In addition, every issue tens of thousands of new people now see the SKEPTICAL INQUIRER on newsstands, and many buy it and become new subscribers.

We welcome you to our quest to advance critical thinking, appreciate the methods of science, apply science and reason, and explore how all these elements of the reflective scientific mind can expose flim-flam and nonsense and also illuminate subtle issues of science and belief.



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Fairy Tales: Film, Photos, Fantasies, and the Child Within Us

One of the most famous hoaxes in modern history, the Cottingly Fairy photographs, was perpetrated (if that is the proper word) by two children. What is intriguing about this event, or rather a sequence of events that took place over a span of years, is the apparently willing public participation in the hoax. Without multitudes of individuals to believe, a child's prank would have disappeared unnoticed.

A rather extraordinary, meticulously crafted, and provocative new film, entitled with some degree of imprecision *Fairy Tale, A True Story,* attempts to recreate not the moment-to-moment facts of what happened in Cottingly in 1917, but rather the public climate that allowed it to flourish and some of the ramifications—good and bad—of a unique series of photographs.

Purported to be of real fairies cavorting in the woods of Cottingly, England, the photos were printed from "single exposure" glass-plate negatives taken at various times by two cousins, Frances Griffiths and Elsie Wright, using Elsie's father's camera. Arthur Wright felt immediately that the photographs had been "contrived" in some way and simply put them away without revealing them to anyone outside of his family; but around 1920, his wife, Polly, took them to Edward Gardner, a leading Theosophist. Gardner, in turn, showed them to Arthur Conan Doyle. Conan Doyle was so taken with them that he wrote an article for *The Strand Magazine* and, later, a full book on the same material. Kodak of England examined the plates and was unwilling to say more than that there was no evidence that the negatives had been tampered with. The events created a sensation in England, which in some respects died down, and in other respects has never quite gone away.

Compressed and fictionalized, understandably, for a ninety-minute motion picture, *Fairy Tale* nonetheless conveys the deep, emotional conflicts of individuals—Conan Doyle, Houdini, the young girls, their parents—struggling to deal with the painful aftermath of World War I and the inadvertent notoriety engendered by the publication of the photographs. Events of five or six years are presented in a much shorter time span, and meetings between Houdini and the two girls that never occurred are created to dramatize genuine disagreements expressed in real-life correspondence between Conan Doyle and the master magician.

Charles Sturridge, director of *Fairy Tale* and also of the finely hewn and respectful recent television miniseries adaptation of *Gulliver's Travels,* spoke with all the surviving relatives of the Griffiths and Wright families and even examined some of the deceased Frances's personal effects that were kept by her daughter. The girls admitted to having faked the photographs with paper cutouts, but to the very end Elsie maintained with tantalizing ambiguity that they had actually seen fairies.

Sturridge, in a telephone interview with me on October 20, pointed out that "all story telling is a way of shaping the chaos that we see in real life into something that is more tolerable, that allows good to win against bad more often. Even in those terms, a story means something that is a lie and something true." Children, he said, as a father of three, are faced on a daily basis with huge volumes of brand new experience. Part of the process of growing up is sorting it all out and learning how to interpret the difference between reality and imagination. Anyone who has watched children play or who remembers their own childhood can see clearly, however, that for a child, the line between fantasy and fact is very, very blurred.

England, despite its cool veneer of respectability and reason, has a rich tradition of myth that includes pantheons of fairy kings and queens, with their attendant protocols mirroring the real-life royal families, intermingled with Irish traditions of leprechauns and other such fabulous creatures. Nothing embodies this more clearly for modern minds than the stageplay of J. M. Barrie's *Peter Pan,* which is presented in a deliciously authentic recreation during the opening moments of *Fairy Tale.* A tale about a boy who never grows up, it contains a famous audience-participation scene in which Tinkerbell, a female fairy, drinks poisoned medicine to save Peter Pan's life. In order to keep her from dying, the audience is asked to "clap if you believe in fairies." Inevitably, the child in all of us applauds so that Tinkerbell won't die.

In some respects, this is the core of the "paradox." Adults know that these things are stories, but children experience the stories much more vividly and credulously. We judge adults who "believe" in such things as gullible, even irresponsible, but, mostly, we tolerate the same behavior in a child as a necessary and, for many people, warm and delightful part of growing up. Inevitably, children come face to face with the "facts" about the Easter Bunny, but how many adults want to be the "one" who reveals them?

Originally calling the film *Illumina-*

tions, Sturridge was compelled to make many title changes in order to please marketing people at Paramount Pictures. This is perhaps the biggest problem with the perception of this motion picture: the phrase "A True Story." In one sense, the title plays fast and loose with the definition of true. By his own admission, Sturridge did not set out to make a documentary film (a worthwhile project that some enterprising individual ought to undertake). He did, however, intend to portray the "truth" of the times in which the events occurred.

"What I mean by a true story," Sturridge explained, "is that almost everything I was able to find out about the story, including the cutouts, are in the film. What the girls told their parents is in the film. The film doesn't seek to judge who is telling the truth. The story lasted so long because the photos were not double exposures or matte shots: They were 'real' photographs that nobody at the time could scientifically disprove. Were they real creatures or cardboard cutouts? In the absence of proof, the photos became a rock against which people's own opinions were split . . . some went right and some left. The film itself offers clearly fake fairies. It is a film, after all. No one really thinks there were eighty-two creatures that we were able to hire and film for the fairy scenes! In the same way, no one believes that the film *Pretty Woman* is about a real prostitute. There is still that element in the story where you have to consider what you yourself think: What do you want to be true? That's what stories do."

Some viewers may object to the appearance of so-called "real fairies" in the film as part of the framing device. There are, of course, in a simplistic sense, two ways to interpret this film. The first view, as some *X-Files* critics would point out, is to interpret the film as showing that fairies are real, that it invites the audience to think that the filmmakers believe in them and that they should too. The other view would be that the movie dramatizes an historical era with all its warts in place, and that the subject matter is less the reality of fairies than the nature of childhood, growing up, and belief.

The metaphor of stage magic, as embodied by Harry Houdini's character in the film, is particularly apt. "The human brain," Sturridge points out, "is split. We have a rational brain telling us that magic on stage logically is not real. But there is another bit of us that wants to believe it is true. That is what is entertaining about it. In the end, anybody you talk to almost anywhere has some item in their brain that tends to contradict everything else, some nugget of contradiction that most of us chuck back there and never look at again."

One could reasonably infer that Houdini, clearly a driven man, was motivated as much by outrage that he could not really communicate with his deceased mother as he was by higher ideals. Conan Doyle, in contrast, was more measured and quiet in his beliefs in spiritualism. In a totally invented scene in the film, Houdini is asked by a reporter whether the girls' story is true. Houdini maintains that he has fought all his life against fraud and exploitation, but not against sincerity. "Masters of illusion *never reveal their secrets*," Houdini finally tells the reporter. As rational adults we have agreed consciously and consensually to this covenant. Children, however, as a natural part of growing up, must learn the difference between illusion and reality.

—Edward Summer

Edward Summer recently wrote about Carl Sagan's Contact *for* SKEPTICAL INQUIRER. *He can be reached by e-mail at sumstuff@juno.com.*

COMMENTARY

Psychic Forecasts Were a Big Flop (Again)

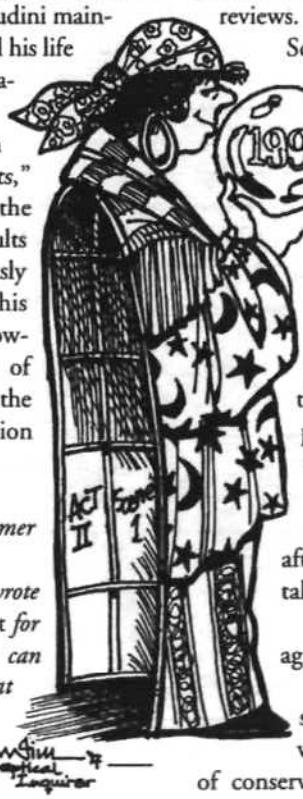
If you think the real news of 1997 was strange, take a look at what was *supposed* to happen, at least in the eyes of the psychics.

It was supposed to be the year Conan O'Brien entered a monastery to take a vow of silence, Mick Jagger became a member of Parliament, and Congress suspended the baseball season after a brawl at a professional baseball game left "scores dead and hundreds wounded."

Once again, the top psychics whose predictions are published in the *National Enquirer*, the *National Examiner*, and the other supermarket tabloids demonstrated that their crystal balls have more than a few cracks.

President Clinton was supposed to "announce that Hillary is pregnant with their second daughter," to be named Virginia in honor of the President's late mother.

Walter Cronkite was supposed to become a lounge singer and get rave reviews.



Scientists were supposed to trap a 7-foot, 6-inch, 450-pound Yeti whose first recorded words, in a crude language resembling English, would be "Wha' dant meddl wi' me."

And Rush Limbaugh, who has failed in past years to live up to psychic predictions that he would run for president or star in a remake of the series *Jake and the Fatman*, was supposed to become a liberal Democrat after having a heart-to-heart talk with Barbra Streisand.

Often the psychics couldn't agree among themselves.

While one tabloid psychic said Pamela Anderson Lee would become "a champion of conservative thought" after finally

dumping husband Tommy Lee and becoming a Washington lobbyist, another predicted that she and Howard Stern would star in the title roles in a rock musical version of *Gone with the Wind*.

Depending on which psychic was writing, 1997 was to be the year that O. J. Simpson would (a) have his ex-wife's murder solved by *Murder, She Wrote* star Angela Lansbury, (b) be "locked away for running over an elderly woman after a night of boozing it up on the town," or (c) become a huge hit on French television hosting "a whodunit show that investigates unsolved murders in France."

On the other hand, three psychics in three different tabloids predicted that John Travolta (who is a pilot in real life) would land a commercial jetliner after the flight crew comes down with food poisoning.

Jeane Dixon, who died in 1997 (but didn't mention it in her forecasts in the *Star*), demonstrated once again why she was the Queen of Equivocation. She said that in 1997 "Saddam Hussein *should* be very careful around an ambitious family member," "Late October *could* bring another plane tragedy over water," and "A temptress or even a female assassin *could* be waiting for President Clinton on a foreign trip" (emphasis added). Dixon also forecast that "the Stock Market [would] fall from record highs." The stock market *always* eventually falls after it hits a new record high. The question is how low it will fall.

With so many psychics making so many predictions, it is surprising that more forecasts don't come true. Based on my files, the last tabloid psychic to score on a major prediction was Clarissa Bernhardt, a regular for the *National Enquirer*. The tabloid gives her credit for predicting "the devastation of Florida by Hurricane Andrew in 1992."

In June 1992, she said: "Scientists will be shocked in October when 'earthquake proof' Florida is hit by a tremor—only weeks after being slammed by the worst hurricane in the state's history." The quake didn't happen, but Andrew did.

However, her other forecasts for that same year and subsequent years indicate that it was a half-lucky guess. One of her other predictions for 1992 was that kilts would "become the hottest new fashion since bell-bottoms." For 1993, Bernardt predicted that space debris would crash in Lima, Peru, "leveling government buildings and killing many of that nation's leaders"; Rush Limbaugh would save Ted Kennedy from a car wreck; and deep-sea explorers would discover a "miraculous over-the-counter baldness cure" in a rare aquatic plant. And in 1996, Jay Leno was supposed to lose his *Tonight Show* job to Johnny Carson, and Geraldo Rivera should have had his nose broken during an on-air fistfight with Madonna.

In Bernhardt's crystal ball, 1997 was to be the year "aliens from an oil-hungry planet [would] descend on earth and siphon our oil reserves into huge tanker spacecraft for two weeks before vanishing."

For some reason, when the *Enquirer* touts Bernhardt's accuracy, it only mentions the hurricane part of her forecast—the earthquake part is conveniently omitted. Nor does the tabloid mention her other failed predictions.

And what's in store for 1998?

It is supposed to be the year a stock market crash makes the Great Depression look like a clambake; rising insur-

Photo:
Tim Graham–SYGMA

Diana's Death Eluded 'Psychics'

The biggest 1997 embarrassment for the psychics is what they didn't forecast: the sudden death of Princess Diana.

Instead, 1997 was to be the year Princess Diana announced she would be "moving to Africa to train as a long-distance runner for the Summer Olympics in the year 2000," according to Shawn Robbins, who claims to have foreseen the assassination attempt on the Pope and is one of the *National Enquirer's* "10 top psychics."

The late Jeane Dixon, in a 1989 forecast in the *Star*, predicted for Diana for 1997 that disappointments in love "could lead to a nervous problem in the spring." And for 1998: "Queen Diana will be embroiled in a royal scandal. . . . She may move out of Buckingham Palace and into a home of her own—or Diana could do the 21st century equivalent of retiring to a convent to become a nun."

"Internationally renowned psychic" (at least in the eyes of the *National Examiner*) Luna Diamond foresaw the following for Diana in 1997: "Super-slim Princess Di has a nervous breakdown—triggered by a mysterious thyroid condition that causes her to balloon to 215 pounds."

In the *Globe*, Mystic Meg said that Diana would "get stood up for a date by heartthrob Kevin Costner." If only that had been the big event in her life in 1997.

The psychic who had the best chance of warning Diana was Derbyshire psychic Rita Rogers. Diana and Emad (Dodi) Fayed visited Rita Rogers on August 13, shortly before their death two and a half weeks later. Obviously the visit made no difference.

—C. Eugene Emery Jr.

ance costs are supposed to force the NFL to eliminate tackle football in favor of two-handed touch; a U.S. mission to Mars will discover a civilization resembling that of ancient Greece; manufacturers will create a bestselling snack food made of crisp-fried caterpillars, locusts, and grubs; and researchers will discover an aphrodisiac that lets men as old as ninety have sex up to ten times a day.

—*C. Eugene Emery Jr.*

Gene Emery is a science and medical writer. His weekly computer software column appears on the Reuters news service. His address is 46 Highland Street, Cranston, RI 02020. His e-mail address is gene.emery@prodigy.net.

Australian Geologist Plimer's Costly Court Battle With Ark Creationists

In 1992, Melbourne University geology professor Ian Plimer initiated legal action against Allen Roberts and the organization Ark Search under Australian laws regarding copyright and fair trades practices. He sued on the grounds that the creationists were engaged in misleading and deceptive conduct while engaged in trade and commerce. On April 7, 1997, the trial began in Sydney.

Australia does not have a statute comparable to the United States' First Amendment calling for religious neutrality in public institutions, thus scientists and others disturbed about inroads creationists are making in Australian schools cannot use the legal approach Americans have relied upon to defend science classes from religiously based dogma. Plimer's novel legal strategy was to argue that because Roberts and his Ark Search companions claimed scientific evidence of having discovered the final resting place of Noah's Ark in Turkey, they were guilty of scientific fraud and misleading and deceptive conduct. Because Roberts and Ark Search raised money from the public to support their expeditions by selling tickets to lectures, and also sold books, videos, and other materials, Plimer argued that they were engaged in business fraud. Other points raised in the lawsuit were allegations that Roberts/Ark Search plagiarized drawings of the Ark from a book written by an American, former "Arkaeologist" David Fasold, and that Roberts's claim to be "Dr." Roberts was also false and misleading because his degree came from a Florida diploma mill.

The trial proceeded more quickly than either side had anticipated and was over in seven days. The Australian Skeptics Web page offered a running commentary on each day of the trial (http://www.skeptics.com.au). There was considerable interest in the trial in the Australian media, which followed it closely, and there were follow-up stories in the British science journal *Nature* and also in *Science* magazine.

After what seemed like a very long wait, Judge Ronald Sackville issued his decision on June 2. A carefully worded document of close to one hundred pages, the decision clearly attempted to avoid getting caught in the molasses swamp of science versus religion. On the plagiarism issue, Sackville determined that Ark Search had indeed appropriated David Fasold's illustrations, and awarded him A$2,500. He ruled against Plimer on the fair trade practices issue, saying that Ark Search and Roberts were not, in fact, engaged in business or trade as defined by the relevant statutes.

In support of Plimer's main claim, however, Sackville agreed that Roberts had made false claims about having conducted scientific tests at the site of the Ark, saying, "These representations were false and, had the Fair Trading Acts applied, would have constituted misleading or deceptive conduct on Dr. Roberts's part."

The judge also expressed reservations about free speech rights, questioning whether even false statements of the sort Roberts had been making might be allowable because of their religious content. The judge wrote:

> Moreover, in my view, considerable care must be exercised before making orders restraining statements made in the course of public discussion on issues regarded by many people as important to their religious or ideological beliefs, at least where the motivation for making such statements is not primarily commercial in character. Unless caution is exercised, there is a serious risk that the courts will be used as the means of suppressing debate and discussion on issues of general interest to the community.

Free speech was important to both sides, however, as the precipitating events that encouraged Plimer to take a strong stance against Australian creationists occurred when he and other scientific colleagues were thrown out of public auditoria for the audacity of asking questions about geology and other sciences that Roberts could not answer.

Plimer's solicitor, Greg Judd, has told the National Center for Science Education that they are planning to appeal, arguing that the activities of Roberts and Ark Search do indeed constitute trade or commerce. It is highly significant that the judge agreed with Plimer on the substantive issue of the falsity of the claims about scientific investigation at the Turkish site, validating Plimer's fact claims. Appeals typically take three to six months, and are heard before three judges.

Plimer and his wife had earlier sold their house to finance the lawsuit and under Australian law have had to pay costs up front as the case has progressed. Although he has benefited from a donation of over A$100,000 from an anonymous benefactor and has also received assistance from the Australian Skeptics, Plimer is near bankruptcy. As the loser, Plimer also will be responsible for paying Roberts's costs, estimated at over A$300,000. After the announcement of the judge's decision, Australian Skeptics chair Barry Williams wrote me:

> My phone hasn't stopped ringing today with people offering support, financial and otherwise, for Ian. . . . Included among the support was a subscriber (an electronics technician) who took a whip-around among his work mates and visited me in his lunch hour today to present me with a check for A$100. I have had calls from people in Sydney, the Gold Coast, and Perth saying they were sending donations. An Anglican minister rang to ask how he could help raise some money for Ian.

He went on to say:

> There is no doubt we are winning the PR war hands down. We have never had so many calls in such a short time over any other issue. At last people seem to be waking up to the dangers inherent in letting fundamentalists go unchallenged.

(Those wishing to donate to the Plimer defense fund may contact the Australian Skeptics at their Web site, mentioned above, or write to Reverend Brian Nicholls, OAM, 511 Mcgowan St., Broken Hill, New South Wales 2880, Australia.)

—Eugenie Scott

Eugenie Scott, a CSICOP fellow, is director of the National Center for Science Education. This article is reprinted by permission from its publication NCSE Reports.

ABC's *Good Morning America* Touts ESP, Psychokinesis, Astrology

The following item by physicist Robert L. Park appeared in the American Physical Society's *What's New* electronic newsletter, October 3:

> ABC-TV: "Fringe or Frontier? Science on the Edge." It was more like over the edge. Remember *Good Morning America* science editor Michael Guillen? We last saw him gushing over Patterson cells (*WN* 13 Jun 97), cold-fusion devices that also "neutralize radioactivity." Well, this week Guillen was back with a three-part series, gushing over precognition ("these guys are not flakes," he concludes), astrology ("I think we're just going to have to suspend judgment"), and psychokinesis ("you have to take it seriously . . . if it's right you can foresee a future of mind-controlled wheel chairs, computers, and jet fighters"). Guillen, a Ph.D. physicist who is uniquely positioned to help millions of viewers understand that they live in a rational universe, has chosen instead to tell them that their sad superstitions are open scientific questions. It must be very good for ratings.

Park, in response to the SKEPTICAL INQUIRER's follow-up query about the programs (which featured brief interviews with three CSICOP fellows but made no mention of CSICOP), said, "Guillen does not profess [during the programs] to believe these things himself; he either says he has an open mind or in some cases expresses mild skepticism. The problem is that he treats them as open and important scientific questions that must be taken seriously."

First Issue of New Journal Examining Alternative Medicine Published

The first issue of a new journal providing scientific evaluations of alternative medical practices has now been published.

Vol. 1, No. 1 (Fall/Winter 1997) of *The Scientific Review of Alternative Medicine* includes analyses of homeopathy, therapeutic touch, chelation therapy, and the supposed anticancer agent hydrazine sulfate.

The journal, announced in our September/October 1997 issue (p. 31), is endorsed by the new Council for Scientific Medicine, edited by physician Wallace Sampson, and published by

Prometheus Books. Sampson, a CSICOP fellow and longtime scientific critic of alternative medicine, is a clinical professor of medicine at Stanford University and associate chief of hematology/oncology at the Santa Clara Medical Center in San Jose, California. The executive editor is Lewis Vaughn, coauthor with Theodore Schick of *How to Think About Weird Things.*

The journal's founders say it is "the first peer-reviewed journal dedicated entirely to the scientific, rational evaluations of unconventional health claims."

In a statement, "In Defense of Scientific Medicine," the members of the Council for Scientific Medicine say they believe the need for "objective, scientific critiques of the claims of 'alternative' or nonconventional medicine has never been greater."

The efficacy of such treatments has not been shown, the media too often "dote on controversial and false claims," and the public and even some medical professionals seem unaware of credible, scientific assessments of many alternative medical claims, said the Council. It also said several earlier new journals devoted exclusively to alternative medicine "merely advocate unconventional treatments and rarely assess them objectively."

continued on page 12

Fund for the Future

CSICOP AT THE CENTER FOR INQUIRY

An Unprecedented $20 Million Drive for the

Human beings have never understood the material universe as thoroughly as they do today. Yet never has popular hunger for superstition, pseudoscience, and the paranormal been so acute.

CSICOP and the *Skeptical Inquirer* are leading advocates for skepticism nationally and worldwide. But so much more must be done in the years to come.

Day and night, the Center for Inquiry has become a focus of academic and popular inquiry.

Publishing revenues alone cannot fund the bold outreach today's challenges demand. Hence the Fund for the Future Campaign, a ten-year effort to add 20 million dollars to the Center for Inquiry endowments.* Gifts and endowment income will fund projects including:

Council for Media Integrity

Formed just weeks after its inclusion in the Ten-Year Plan, the Council for Media Integrity will monitor and rebut media programs that convey unfounded claims and mislead the public about science. Members include Steve Allen (chair), Stephen Jay Gould, and many others. CSICOP will invest in electronic infrastructure to facilitate rapid response to irresponsible programs.

Adult Education

The Council cosponsors the Center for Inquiry Institute, which has already expanded its offerings to include a new three-year certificate program in science and skepticism. Sessions are scheduled in Amherst and Los Angeles.

Enhancing Library Resources

The Center for Inquiry's skeptics' library—already the finest of its kind in the world—needs expanded funding to enlarge its core collection and add electronic media. Worldwide modem access to the library's catalog is already nearly complete.

*Combined endowment goal of CSICOP and the Council for Secular Humanism, both nonprofit tax-exempt educational organizations.

Steve Allen
Honorary Co-chair

Martin Gardner
Honorary Co-chair

Future of Science and Reason

The New Ten-Year Plan

To continue its leadership in the defense of reason, CSICOP has articulated a Ten-Year Plan designed to:

- *Promote science and reason*
- *Develop public support and participation*
- *Develop The Center for Inquiry as an education and research center*
- *Build up the Committee's resources*

The Center for Inquiry attracts global media attention with scholarly conferences and events like this public "Friday the 13th Superstition Bash."

For the Young

To present skeptics' message more compellingly to the young, CSICOP will develop new materials—ranging from age-appropriate print publications to audio and video cassettes and instructional courseware. Goals include enhanced understanding of science and improved critical thinking skills.

Regional Outreach

With the establishment of The Center for Inquiry - West (Los Angeles), The Center for Inquiry - Midwest (Kansas City) and The Center for Inquiry - Rockies (Boulder, Colorado), giant steps have been taken to enhance direct field service to skeptical activists. Additional regional Centers are planned with expanded calendars of activities.

How Can I Help?

The Center for Inquiry Fund for the Future depends on generous support from each of our readers and friends. Gifts of cash, securities, and other assets are sought. A three-year pledge can make more substantial gifts surprisingly affordable. Many forms of planned giving arrangements can be arranged. All requests will be held in confidence.

Only financial support from skeptics and other friends of science can place the skeptical movement on a firm financial foundation.

At the first World Skeptics Congress in Amherst, New York, participants gave or pledged an unprecedented $201,000 to give the Fund for the Future campaign a vigorous start.

We invite you to make your commitment to the Fund for the Future today. For more information, complete and mail the postpaid reply card.

CSICOP
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Amherst, NY 14226-0703

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continued from page 9

Signers of the statement include five Nobel laureate scientists including Baruj Benacerraf, president emeritus of the Dana Farber Institute; Francis Crick of the Salk Institute; and Arthur Kornberg of Stanford University.

The Council said the journal will "apply the best tools of science and reason to determine the validity of hypotheses and the effectiveness of treatments. . . . It will . . . seek justified answers to two questions: 'Is it true?' and 'Does the treatment work?'"

In an opening editorial, "Why a New Alternative Medicine Journal?" Sampson says the existing journals in the field allow contributors to follow "trails of thought less encumbered by brambles of rigorous methodology."

"Proponents [of alternative medicine] are calling for a different set of evaluation techniques to include, or even be defined by, patient satisfaction. This journal will be devoted to the standard rational analysis of the claims."

The *Review*'s debut received international media coverage at a press conference in October in Washington, D.C., that included CNBC, MSNBC, Fox News, *USA Today*, *Chicago Tribune*, *American Medical News*, and the journals *Science* and *Nature*.

For subscription information, call 1-800-421-0351, 716-691-0133, or fax 716-691-0137.

* * *

Another new source of good information about alternative medicine is CSICOP fellow Stephen Barrett, M.D.'s "Quackwatch" Web site. A guide to health fraud, quackery, and intelligent decision making, it can be found at http://www.quackwatch.com. It includes descriptions of scores of questionable products and services, information on nonrecommended sources of advice, a host of information on consumer protection and making good decisions about heavily promoted products and methods, and links to other Web sites.

Californians Rate High-Tech, Scientists Highest Among All Institutions

Californians have more confidence in high-technology companies and research scientists than in any other institutions, even more than the medical profession and U.S. Supreme Court, according to a Field Poll published in the *San Jose Mercury News*.

California is the most populous state and a center of the booming high-tech computer and microelectronics industries, as well as a home to major research universities.

Californians' level of confidence in high-tech companies is higher now than in 1984—the last time Field took such a measurement—bucking a general decline of public confidence in most of the thirty-four other institutions measured, according to Mark DiCamillo of the Field Poll.

"I think the public is equating high-tech companies with the good economy," DiCamillo said. "There is usually a halo effect where, if a person, a president, say, is rated very well, there is usually an economic component."

Research scientists had the next highest level of public confidence in the new poll, followed by, in order, local police departments, universities and colleges, NASA, and the U.S. military. At the bottom of the confidence rankings were government health and welfare programs, oil companies, the criminal justice system, the legal profession, and, coming in last, insurance companies.

Overall, 45 percent of people surveyed said they had "a lot" of confidence in high-technology companies and only 6 percent said they had "not much." In 1984, high-tech companies placed third in the poll, behind universities and colleges, and behind research scientists.

Just what "confidence" means to those surveyed is unclear because it was not defined for them.

The results of the Field Poll, reported October 1, 1997, are based on a telephone survey, conducted August 14 through August 24, of 1,007 Californians called at random throughout the state. The polling was conducted in both English and Spanish. The poll has a margin of error of plus or minus 4.5 percentage points.

—Kendrick Frazier, Editor

CNBC Show Tackles Dennis Lee's Free-Energy Claims

While many books traffic in rumors of free-energy machines, the CNBC cable-TV show *Deals and Steals* took a responsible look at the background and free-energy claims of Dennis Lee (see *SI*, July/August 1997). The show ran a two-part investigation September 30 and October 1.

The show's producers were assisted by Philadelphia-area skeptics Eric Krieg and Tom Napier, who helped supply research information and gave statements shown on the air.

Highlights of the show included statements by victims, Dennis Lee trying to wrestle away a rap sheet unraveled by producer Allen Levine, and Lee warning followers that skeptic Eric Krieg is backed by the CIA.

Unfortunately, this show is going to be taken off the air.

CFI–Midwest's Inaugural Program a Success

The new Center for Inquiry–Midwest (Kansas City, Missouri) held a successful inaugural conference, "Science and the Culture Wars: Defending Science and Reason in an Irrational World," October 24–26, an event that formally marked the establishment of a new regional office of CSICOP.

Numerous speakers from the Kansas City area discussed the war between science and the supernatural, the lure of paranormal beliefs, the battle against "scientific" creationism, and challenges of multiculturalism and the New Age. Also present were CSICOP Chairman Paul Kurtz and other representatives from the Center for Inquiry–International, home of CSICOP's headquarters in Amherst, New York; SKEPTICAL INQUIRER editor Kendrick Frazier; and members of CSICOP's Executive Council and Board of Directors, including James Alcock, Ray Hyman, Lawrence Jones, Philip J. Klass, Joe Nickell, and Bela Scheiber. CSICOP held its board meeting in Kansas City to coincide with the conference.

The conference was co-sponsored by CFI–Midwest, the Kansas City Committee for Skeptical Inquiry, and the Kansas City Eupraxophy Center.

The conference also marked the kickoff of CFI–Midwest's "Rallying Point" capital fund drive. More than $10,500 was pledged to support CFI-Midwest operations and to fund the eventual construction or acquisition of a building to permanently house the Midwestern regional office.

— *Tom Flynn*

Tom Flynn is media coordinator for CSICOP.

Oh, the Dangers of Dihydrogen Monoxide

A freshman at Eagle Rock Junior High won first prize at the Greater Idaho Falls Science Fair, April 26, 1997. He was attempting to show how conditioned we have become to the alarmists practicing junk science and spreading fear of everything in our environment. In his project, he urged people to sign a petition demanding strict control or total elimination of the chemical "dihydrogen monoxide," and for good reason, since:

1. it can cause excessive sweating and vomiting;
2. it is a major component in acid rain;
3. it can cause severe burns in its gaseous state;
4. it can kill you if accidentally inhaled;
5. it contributes to erosion;
6. it decreases effectiveness of automobile brakes;
7. it has been found in tumors of terminal cancer patients.

He asked fifty people if they supported a ban of the chemical dihydrogen monoxide. Forty-three said yes, six were undecided, and only one knew that the chemical is more commonly called "water." The title of his prize winning project was "How Gullible Are We?" The conclusion is obvious.

Editor's Note: The above item was distributed on the Internet and submitted by several readers. In a subsequent article about it distributed by the *Los Angeles Times–Washington Post* News Service (Oct. 22), economics writer James K. Glassman confirmed the details (it wasn't an urban legend; he talked to the boy's mother) and put the subject into the perspective of bad science prevalent in society.

The science-fair project was carried out by Nathan Zohner, 14, whose parents both work at the Department of Energy's Idaho National Engineering and Environmental Laboratory in Idaho Springs, Idaho. Nathan was discouraged with what his little test indicated. "I was appalled that my peers were so easily misled. . . . I don't feel comfortable with the current level of understanding." Glassman says adults are just as likely to fail the test and to suggest banning the substance. "The implications of Nathan's research are so disturbing that I've decided to coin a term, 'Zohnerism,' defined as the use of a true fact to lead a scientifically and mathematically ignorant public to a false conclusion." □

Skeptic in the News

CONTROVERSY

CODE BREAKER

Dave Thomas believes *The Bible Code* is just a new testament to old-fashioned gullibility

Physicist and SKEPTICAL INQUIRER Consulting Editor Dave Thomas and his critical analysis of Michael Drosnin's *The Bible Code* (*SI*, November/December 1997) was the subject of a two-page feature, "Code Breaker," in the November 3 *People* magazine. Thomas told *People* writer Michael Haederle that when he heard one of Drosnin's assertions, "My baloney detector went off three-alarm." The article relates how Thomas programmed his computer to find the same kinds of supposed "hidden messages" in other texts. "He [Drosnin] says these messages are beyond chance, and I've proven they're not," says Thomas. Beneath a photo by Eric O'Connell of Thomas with blocks of code projected onto his face is another Thomas quote: "Applying scientific methods to the Bible [is] demeaning to religion and dangerous to science."

Is Cannibalism a Myth?

"Must have been someone he ate."

—Bob Hope, after hearing an African native burp loudly in *The Road to Zanzibar*

Cultural anthropologists disagree over lots of things. Some still cling to the fading tradition of extreme cultural relativism, which forbids one to make value judgments about any culture. For example, it prevents an anthropologist from condemning Nazi anti-Semitism or American slavery because each was once embedded in a culture. It prevents condemnation of the widespread practice today, in Africa and elsewhere, of slicing off the clitoris of young women. More enlightened anthropologists find such relativism impossible to defend.

Some anthropologists, such as the late Margaret Mead, are strong believers in paranormal powers that are the stock in trade of parapsychologists. The vast majority of their colleagues consider this nonsense.

The latest, and perhaps the most bitter, of squabbles is over cannibalism. Most anthropologists remain convinced that cannibalism was widespread in the past and continues to flourish in obscure pockets of the world. This belief is defended in hundreds of papers and in such popular books as Eli Sagan's *Cannibalism* (1974) and Garry Hogg's *Cannibalism and Human Sacrifice* (1973).

A growing minority of anthropologists think otherwise. They are persuaded there is not now, nor has there ever been, a culture that routinely eats its dead, or that kills and devours its enemies. The debate simmered for decades until 1979, when it was blasted wide open by William Arens, an anthropologist at the State University of New York at Stony Brook. The blast was his explosive book *The Man-Eating Myth: Anthropology and Anthropophagy*. First published by Oxford University Press in 1979, it is currently available in softcover.

No one denies that during life-and-death emergencies, such as starving after a shipwreck or airplane crash, or during times of extreme famine, individuals may choose to eat human corpses rather than die.[1] No one denies there have been occasions among primitive peoples when, after a military victory, the body of a once-feared enemy leader was ritually devoured, either out of revenge or out of a belief that the enemy's powers would be acquired by the eaters. No one denies the existence of pathological serial killers, even in advanced cultures, who murder and feast on their victims.

The big question is this: Has cannibalism ever been a common custom? Arens's maverick opinion is that this kind of cannibalism is pure folklore, fabricated by the desire of one culture to feel superior to another. No trustworthy anthropologist, or any other reliable person, he contends, has ever directly observed a cannibal feast. The myth arose, he is convinced, from unsupported charges made by one culture against a hated neighboring culture, and by gullible missionaries and naive anthropologists who swallowed every tall tale told them by friendly natives.

A random check of current anthropology textbooks shows that most authors take for granted that cannibalism not only was widespread in the past, but also persists today among primitive tribes in Africa, South America, and on islands in Oceana. Respected anthropologist Marvin Harris, in *Cannibals and Kings* (paperback, 1991) argues that cannibalism among the Mexican Aztecs was a way to obtain much-needed protein.

As for the public at large, who can doubt that there have been, and perhaps still are, fierce headhunters who eat their prey? Cannibalism continues to turn up in fiction and movies, in cartoons showing persons being boiled alive in enormous caldrons, and in crude jokes.

Have you heard about the cannibal whose cousin disagreed with him? Or the cannibal who admitted his wife

Martin Gardner's latest book is The Last Recreations *(Springer-Verlag, Copernicus, 1997), a collection of twenty-three of his* Scientific American *columns from the last seven years before his retirement from the magazine in 1981.*

made such a great pot roast that he would surely miss her? Or the Catholic cannibal of many years ago who on Friday ate only fishermen? Or the dentist who filled a cannibal's teeth while the cannibal was eating? Or the cannibal who told a psychiatrist he was fed up with people? Asked how he liked the psychiatrist he replied, "Delicious." And we must not forget the cannibal who was walking through the jungle when he passed his mother-in-law.

Of several cannibal limericks I have come across, I like this anonymous one best:

> A cannibal bold of Penzance
> Ate an uncle and two of his aunts,
> A cow and her calf,
> An ox and a half,
> And now he can't button his pants.

The word *cannibal* derives from *Carib*, the name of an indigenous people of the West Indies and South America encountered by Columbus. In his journal Columbus described the Caribs as man-eaters. Why? Because he was told this by their neighbors, the Arawaks. How did Margaret Mead know that the Mundugumors of New Guinea were cannibals? The "gentle Arapesh" said so.

Arens documents hundreds of similar instances of one culture accusing another of cannibalism. The ancient Chinese thought Koreans were cannibals. Koreans thought the same about the Chinese. The Aztecs accused their Spanish conquerors of cannibalism. The conquistadors, who wrote all the books, are of course the main source for belief in Aztec cannibalism. When Arens was doing fieldwork in Tanzania, natives assured him that Europeans were cannibals. No culture in the world, he writes, ever claimed itself to be cannibalistic. Always, some other culture makes the accusation. As physicist Philip Morrison put it, praising Arens's book in *Scientific American* (September 1979), "[S]o it always seems: not us but them, or perhaps long ago and in another place."

Classic references to cannibalism go back to ancient Greek myths and the cyclops of Homer's *Odyssey*. Herodotus gave a secondhand account of cannibalism among the nomadic tribe called the Androphagi. In the Middle Ages, Catholics accused Jews of ritually devouring Christian babies. It was widely believed that witches also killed and gobbled babies. Incredibly, such a belief persists to this day among some ignorant fundamentalists obsessed by the notion that satanic rituals, including baby-eating, are taking place all over the United States!

Wild descriptions of cannibalism soared in the sixteenth century in hundreds of books by travelers and explorers. Hans Standen, a German sailor, wrote lurid accounts of savage headhunters among the Tupinamaba Indians of Brazil. His imaginary dialogs and appalling woodcuts were reprinted endlessly by other writers around the world.

Contributors to today's leading encyclopedias all defend ritual cannibalism: Ronald Berndt in *Academic American Encyclopedia*, Paula Brown in *The Encyclopedia of Religion*, and Leslie Spier in *Collier's Encyclopedia* and in *Encyclopedia Americana* (current editions). For horrendous earlier articles on cannibalism, see the eleventh edition of *Encyclopaedia Britannica* (reprinted in the fourteenth). The current *Britannica* has no article on the topic. An even worse article (sixteen pages!) is by an erudite Anglican priest in *The Encyclopedia of Religion and Ethics*.

American Indians, especially the Iroquois tribes of New York, were branded cannibals by early white missionaries who saw them as cruel, mindless savages. The *Britannica's* eleventh edition says that *Mohawk*, the name of an Iroquois tribe, probably means "man-eaters." There is not a shred of reliable evidence that the Iroquois, or any other native American culture, indulged in the ritual eating of human flesh.

Many anthropologists have written about cannibalism among Australian and New Zealand Aborigines. Michael Pickering, in *Cannibalism Among Aborigines?*, a thesis completed in 1985 for the anthropology department of the Australian National University, concluded after an exhaustive study of the evidence that Aboriginal cannibalism never existed.

One of the woodcuts in Hans Staden's 1557 work *The True History and Description of a Country of Savages, a Naked and Terrible People, Eaters of Men's Flesh, Who Dwell in the New World Called America*. Staden is the fig-leafed man on the right, his hands clasped in prayer. (From Arens's book.)

Descriptions of cannibalism are often mixed with unbelievable fantasy. Arens tells of an informant who, after disclosing to an anthropologist the human-flesh-eating customs of a neighboring people, added that the cannibals were all women who could, at will, turn themselves into birds!

The curious thing about the vast literature on cannibalism is the absence of firsthand accounts. Anthropologists never actually *see* a human-flesh-eating ritual. No photographs of the practice exist. "Cannibals are always with us," writes Arens, "but happily just beyond the possibility of direct observation."

The heated controversy between anthropologists who agree with Arens and those who dismiss his book as worthless is summarized as follows by Lawrence Osborne in "Does Man Eat Man?", an excellent article in *Lingua Franca* (April/May 1997):

> The result of this uproar has been a crisis at the heart of the discipline, with different schools of anthropology—cultural, physical, and archaeological—turning in radically different verdicts on whether people are, or ever were, cannibals. It's enough to make some wonder if the always shaky alliances between anthropology's subfields are doomed to collapse altogether.

Mainline anthropologists have reacted to Arens's book with the same kind of

fury they displayed toward Derek Freeman's *Margaret Mead and Samoa*, a book exposing Mead's gullibility in taking at face value the myths told to her by Samoan pranksters. Anthropologists have yelled insults at Arens in meetings. They have pounded him relentlessly in their writings. Reviewers called his book "dangerous" and "malicious." The American Anthropological Association conducted a panel on cannibalism. Its attacks on Arens were published by the Association in *The Ethnography of Cannibalism* (1983), edited by Paula Brown and Donald Tuzic.

In 1989, British anthropologist Sir Edmund Leach declared: "Montaigne writing about cannibalism in the sixteenth century is still far more convincing than Arens writing . . . in 1979." Anthropologist Vincent Crapanzano, reviewing Arens's book harshly in *The New York Times Book Review* (July 29, 1979), called it "poorly written, repetitive, snide."

D. Carlton Gajdusek, a physician who won a Nobel Prize for investigating a rare viral disease in New Guinea known as *kuro*, claimed the disease was transmitted by cannibals in the Foré tribe when they handled corpses. Believing the evidence to be so overwhelming for New Guinean cannibalism, he said, "It's beneath my dignity" to answer Arens. On the other hand, Lyle Steadman, of Arizona State University, after two years of work in New Guinea, failed to find any evidence of cannibalism.

In spite of his opponents, Arens's skepticism is slowly gaining respectability. Osborne reports in his *Lingua Franca* article that the 1996 *Encyclopedia of Anthropology*, in its entry on cannibalism, concludes: "Cannibals are largely creatures of our own surmise." Paul Behn, in *The Cambridge Encyclopedia of Human Evolution* (1992), writes: "Ritual or habitual cannibalism is rare or nonexistent: There are no reliable, first-hand witnesses of the practice, and almost all reports are based on hearsay." (See also Behn's article "Is Cannibalism Too Much to Swallow?" in *New Scientist*, April 27, 1991.) Noted anthropologist Ashley Montagu, long suspicious of cannibal accounts, has given Arens's book high praise.

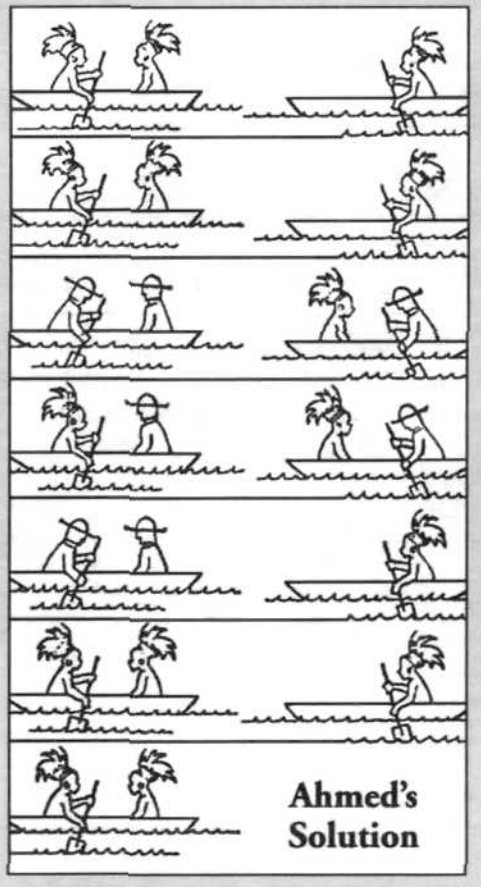
In recent years paleontologists and archaeologists have claimed to have found evidence of cannibalism in human bone fragments among Neanderthal skeletons and in the burial sites of other ancient cultures. Archaeologist Timothy White, of the University of California at Berkeley, in his book *Prehistoric Cannibalism at Mancos* (1992), gives his reasons for believing that bone fragments in Pueblo Indian burial mounds in Colorado's Mancos Canyon prove that the Anasazi Indians had frequent cannibal feasts. He has likened Arens to a flat-earther who denies the world is round.

Not all experts buy White's conjectures. They find explanations other than man-eating for the conditions of his more than two thousand bone fragments. The fragments may indicate burial practices or eating by wild animals. Even if they are evidence of cannibalism, they could simply reflect isolated events brought on by famine. See archaeologist Behn's sharp criticism of White's book in *New Scientist* (April 11, 1992), and his contribution to the *Cambridge Encyclopedia* previously mentioned.

Arens will be replying to his detractors in a soon-to-be-published anthology, as yet untitled, by Cambridge University Press. Not being an anthropologist, I hesitate to take sides in this acrimonious controversy, though my sympathies at the moment are with Arens. Perhaps the truth is somewhere in between. Habitual cannibalism may be much rarer than believed by anthropologists who have a vested interest in reinforcing their earlier opinions. And cannibalism may not be as mythological as Arens supposes. Maybe time will settle the question.

Note

1. "The Yarn of the *Nancy Bell*," the best known of W. S. Gilbert's comic ballads, is an account of cannibalism forced by a shipwreck. The yarn is told by the sole survivor, who ate nine of his shipmates. □



Why Did the Cannibal Cross the River?

Mary McCarthy, in her 1980 novel *Cannibals and Missionaries*, introduced a popular river-crossing problem that dates back to the nineteenth century. Here is how she described it:

> The match game Carey had showed Victor had caught on with some of the others, and a whole circle was concentrating on it. It was more of a puzzle, really: you had three matches representing cannibals and three representing missionaries, and the idea was to ferry them across a river in a boat that held two persons. The cannibals could never outnumber the missionaries at any stage, on one river bank or the other, or the missionaries would be eaten: all three missionaries knew how to row, and there was one rowing cannibal.

Here is how McCarthy gave the solution in pictures.

Jesus Among the Clouds

According to a Texas newspaper, a Fort Worth woman has obtained a remarkable photograph of Jesus.

As reported in the *Arlington Morning News,* the woman, a University of Dallas student, took the picture in 1992. She was, she claims, fleeing an abusive husband, traveling with her two-year-old son on a flight between Albuquerque and Seattle. Soon storm clouds appeared and a voice instructed her to take a photograph through the airplane window. Later, when her film was processed, there was a cloudlike shape of a robed figure. "I knew it was Christ," declared the religious woman. Curiously, she seems not to have been very impressed with the picture at the time but rather put it away in a locked jewelry box on a closet shelf. However, she claims the photo recently fell to the floor (from within a locked box?) while she was rummaging in the closet for something else. Since then she has been telling others—including newspaper, radio, and television reporters—about her experiences (Fields 1997).

I spotted the distinctive picture in some clippings a staff member was sorting for me, and it was (as the saying goes) déjà vu all over again. That is because the robed—and headless!—figure in the clouds is ubiquitous. I have seen it show up in one photo after another over the years, like a visual urban legend. In my opinion, supported by a CSICOP computer comparison, each of the photos is a derivative of a common source. Small differences between the photos are explainable by the contrast effects of multi-generational copying.

One incarnation, a picture labeled "Cloud Angel," was circulated by Betty Malz, author of several religious books. It was received by CSICOP, accompanied by the following brief narrative:

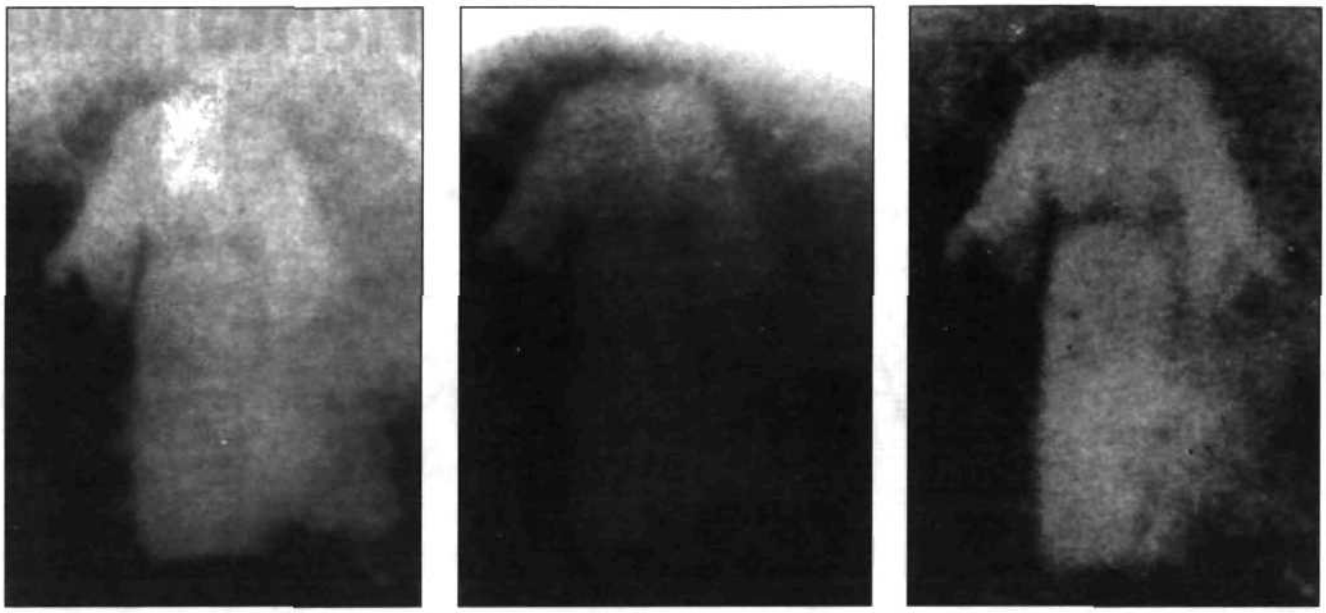
> A couple flying for their first airplane ride, on their honeymoon, took a whole roll of photos out the window of the plane. They were fascinated by the topside clouds, so much like Cool Whip, or Dairy Queen ice cream! The pilot announced on the intercom that they were flying into turbulence that would last about twenty minutes. Bill and his wife prayed aloud, "Oh Lord, protect us, send the Angels of the Lord to hold this plane upright and keep us safe." Almost immediately the choppy wind subsided. The second officer got on the intercom and announced, "It is amazing. The monitor showed turbulence for twenty minutes and it was over in two minutes." Returning home, they found this photo when they picked up their prints at Anderson Pharmacy.

Unfortunately, Malz had "not kept background material" on her publications, and the alleged honeymooning couple remain unidentified. The date is unknown as well, but the event and picture are referred to in Malz's *Angels Watching Over Me,* first printed in 1986.

The photo is also consistent with verbal descriptions of a "Hugo Christ" picture of 1990. (We have been unable to locate a single copy of this picture, although it was reproduced by the hundreds in the Gastonia, North Carolina, area—over a thousand copies reportedly being circulated by Wal-Mart's photo lab alone.) It was described as "a robed figure, arms outstretched, floating among sinister dark clouds," and was alleged to have been taken at the peak of Hurricane Hugo ("Experts" 1990).

On the other hand, a computer imaging expert said of the photo at the time: "It's a picture we've seen many, many times before. It was made in a darkroom." He explained that the image he examined lacked the three-dimensional qualities of a genuine photograph ("Experts" 1990). Moreover, after the picture was shown on the television program *A Current Affair,* a woman from Montgomery, Alabama, stated that, twenty years previously, her sister in New Bern, North Carolina, had given her a photo exactly like it. "I knew what they were saying on TV was a lie," the woman declared ("Jesus in clouds" 1990). And the *Charlotte Observer* ran

Joe Nickell is CSICOP's Senior Research Fellow and author of numerous books including a treatise on photographic investigation, Camera Clues *(University Press of Kentucky, 1994).*



The figure-in-the-clouds photograph has had a lengthy history. While a recent incarnation was a newspaper photo depicting "Jesus" (left), it was circulated much earlier as portraying an "angel" (center), and was interpreted as a "ghost" when it appeared in print as early as 1974 (right). The locale and circumstances change with each appearance of the ubiquitous picture.

an article questioning the photo's authenticity, reporting that "experts said it was a fake and had been circulating throughout the United States for decades" ("Images" 1990).

What is clearly the same figure as the one published in the *Arlington Morning News* appeared as a frontispiece in Peter Haining's 1974 *Ghosts: The Illustrated History.* It is attributed to a Florida man. On the other hand, the same picture illustrates chapter nineteen of Hans Holzer's *America's Restless Ghosts,* which states that it was "taken in 1971 during a terrible storm in rural Pennsylvania" by a woman named Marjorie Brooks. She is described as a "friend and associate" of an "ordained spiritual minister," Rev. Cecilia Hood, who actually sent the photograph to Holzer. Holzer says: "There was a terrible flood and the sky was very dark. Suddenly Miss Brooks observed a figure in white in the sky and took this picture. Was it a way those from the other side wanted to reassure her of her safety?" (Holzer 1993)

Whether or not this reported 1971 date represents the original appearance of the Jesus/Angel/Ghost-in-the-Clouds photograph, it is roughly consistent with the statement of the Montgomery woman that she had seen the "Hugo Christ" picture some twenty years before its reputed late-1989 origin. Even so, she said it supposedly originated in North Carolina rather than Pennsylvania.

Obviously, this record is incomplete, but it is sufficient to suggest that we have not seen the last of the reappearing picture. Not all newspapers have been as willing as *The Charlotte Observer* to mention the picture's many antecedents. Certainly not the *Arlington Morning News.* We repeatedly contacted its editors, but they always asked for more evidence, clearer photos, more time, etc. Ultimately, they never felt obliged to join us in an effort to provide a corrective to the initial story by their religion editor.

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E-mailed Antigens and Iridium's Iridescence

Many readers of this magazine will no doubt recall the 1988 fiasco of so-called "memory water" (*SI*, Winter 1989). According to French biochemist Jacques Benveniste, water that once contained an antigen could somehow "remember" the biological effects of the antigen even after being diluted so greatly that not even a single molecule of the substance was likely to remain. If this principle is correct, then a single aspirin tablet dropped into the world's oceans would convey to every drop of ocean water the ability to cure headaches. The respected journal *Nature* cautiously published the paper by Benveniste and others (*Nature* 333: 816, June 30, 1988) because it could not identify the suspected flaw yielding their improbable result. The matter was then investigated firsthand in Benveniste's lab by *Nature* editor John Maddox, NIH chemist Walter Stewart, and magician James Randi. They found major irregularities in the lab's procedures (*Nature* 334: 287, July 28, 1988), and for the past nine years the matter has been considered closed, except among the true believers in homeopathy.

But far from admitting defeat, a defiant Benveniste recently challenged the skeptics in a large Internet mailing. In it he boasts, "In our lab, this research has now reached a point way beyond the 'memory of water.' We have, we believe, unveiled the hitherto neglected physical nature of the molecular signal, which consists of waves in the kilohertz range, which we have recorded on computers, and sent to any destination of our choice via the Internet network." Yes, he is claiming that water not only has a "memory," but that he can store this memory in his computer, and even send it out over the Internet. By way of proof, Benveniste provides the following:

> Abstract to the Congress of the American Association of Immunologists (San Francisco, February 1997)
>
> TRANSATLANTIC TRANSFER OF DIGITIZED ANTIGEN SIGNAL BY TELEPHONE LINK. J. Aefssa, P. Jurgens, W. Hsueh and J. Benveniste. Digital Biology Laboratory (DBL), 32 rue des Carnets, 92140 Clamart, France, and Northwestern University Medical School, Chicago, IL 60614, USA.
>
> Ligands so dilute that no molecule remained still retained biological activity which could be abolished by magnetic fields [1-3], suggesting the electromagnetic (EM) nature of the molecular signal. This was confirmed by the electronic transfer to water (W) of molecular activity, directly or after computer storage [4-7]. Here, we report its telephonic transfer. Ovalbumin (Ova), or W as control, was recorded (1 sec, 16 bits, 22 kHz) in Chicago using a transducer and computer with soundcard. Coded files were transferred to DBL's computer as e-mail "attached documents." Digitally amplified, they were replayed for 20 min to W (dOva, dW), which was then perfused to isolated hearts from Ova-immunized guinea-pigs. . . .

Benveniste claims that physiological effects of the diluted substance were manifested in those organisms receiving his homeopathy-at-a-distance. If he is correct, in the future your doctor, roused from bed, won't tell you to "take two aspirins and call me in the morning," but will instead send you e-mail, with the appropriate antigen as an attached document, which gets played through your sound card to work its vibrational miracles. Benveniste complained in his mail missive, "Clearly, the shortsightedness of two high priests of Orthodox Science [John Maddox and Walter Stewart] and a prestidigitator [Randi] have delayed this advance in chemistry and biology by ten years."

Another advance in science receiving belated recognition involves Professor John Bockris of Texas A&M University, who was recently awarded the celebrated Ig Nobel Prize for Physics by the Annals of Improbable Research at Harvard. Bockris is a leading researcher in the field of cold fusion whose accomplish-

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Robert Sheaffer's World Wide Web page for UFOs and other skeptical subjects is at http://debunker.com/~sheaffer/ufo.html.

ments have been prominently featured in *Infinite Energy* magazine. However, the prize was actually awarded for his experiments demonstrating the chemical transmutation of base metals into silver and gold. Bockris did not travel to Cambridge to pick up his prize.

The money to fund Texas A&M University's 1993 ventures into alchemical research was donated by William Telander. The *Houston Chronicle* reported last April 3 that Telander was recently released from prison after serving two years for securities fraud. The university still holds $45,000 of his original $200,000 donation, and Telander wants it back unless it is used for its intended purpose—funding Bockris's experiments. The university, however, has frozen the funds, apparently as nervous about funding more alchemy as it is about returning the money.

* * *

During the first fifty years of Saucerdom we had no shortage of objects in the sky to cause UFO sightings. Now, in the fifty-first year of that era, we suddenly must contend with an entirely new phenomenon guaranteed to bamboozle the casual skywatcher. A new generation of global communications technology is now being developed and deployed, under the name "Iridium." This is a series of communications satellites developed by Motorola's Satellite Communications Division to provide direct satellite-to-telephone communications, virtually anywhere on the globe. While the system is not yet operational, the first Iridiums were launched May 5, 1997 (for more information, see http://www.iridium.com:80).

Almost immediately, amateur satellite watchers began reporting remarkable things. While the Iridium satellites are not particularly large and are normally visible only with the aid of binoculars, satellite watchers were astonished to see one or more of the Iridiums suddenly flare up to be as bright as the brightest stars, then fade back to invisibility. Additional skywatching revealed that the Iridium satellites would often flare so brightly as to actually outshine Jupiter, or even Venus. Indeed, experienced satellite watchers have occasionally reported flares from the Iridium satellites so bright as to rival the first-quarter moon, and some have even been observed during daylight.

Mathematical analysis by Rob Matson and Randy John, both authors of satellite-tracking software, quickly yielded an answer to the mystery. The four Main Mission Antennas of an Iridium satellite, developed by Raytheon, are oriented at 90 degrees to each other. While they are not especially large (188 by 86 cm), they consist of highly reflective aluminum flat plates, treated with silver-coated Teflon for thermal control. Each being maintained at an angle of 50 degrees from Earth toward the satellite's zenith, one always facing in the direction of the satellite's travel, they probably represent the best flat reflecting surfaces ever to orbit Earth. When the angle is just right between the satellite, the observer, and the sun, sunlight reflecting off the silvered panels results in the sudden appearance of a dazzlingly bright, slow-moving, unexpected object that disappears in about twenty seconds or less—the perfect culprit to cause UFO sightings. The flare-up lasts just long enough for someone to shout "Look! Up there!", giving the crowd a few seconds of dazzling brilliance, then fading completely from view. (For more information on the Iridium flares and to download software to predict them, see http://www2.plasma.mpe-garching.mpg.de/sat/vsohp/iridium.html.)

Flares from the thirty-four Iridium satellites now in orbit are visible sporadically in most locations around the globe, typically occurring during the time of evening or morning twilight. When the Iridium program is fully deployed, it will consist of sixty-six satellites. Hence, the flares can be expected to increase in frequency and continue indefinitely.

While we are on the subject of satellites that mimic UFOs, we should mention Superbird A, a dead Japanese communications satellite now adrift in the satellite graveyard just outside the Clarke belt of geosynchronous orbit, many times more distant than the Iridium satellites. It, too, sometimes reflects the sun from both the front and back side of its huge solar panels as it tumbles approximately once every twenty-three seconds. When the satellite is favorably placed in the sky, for a period of about six minutes per evening observers can see millisecond-duration pulses of light every 11.6 seconds, looking for all the world like a strobe flash hanging in the heavens.

While not nearly as bright as the Iridium reflections because of its great distance, Superbird A is the only object in or near geosynchronous orbit regularly visible to the naked eye. Because of its distance from Earth, Superbird A can be expected to remain in orbit for intervals measured in "eras," not "millennia." The night sky will continue to glitter with space junk long after we're all dead. □

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Testing New Claims of Dermo-Optical Perception

Can blindfolded people really see through their skin? Two very reputable laboratories in Paris think they have obtained hard evidence to prove some subjects can. A team of scientists in Grenoble performs a critical experiment to ascertain the validity of this claim.

CLAUDIO BENSKI and SCIENTISTS from CRSSA[†]

Introduction

Dermo-optical perception (DOP) can be described as the ability to "see" without using the eyes. Under the DOP assumption, it is claimed that parts of the skin, mainly but not exclusively in the forehead, are used as visual sensors through a yet-undiscovered mechanism. This aptitude has been a classical feature in many human mythologies, assigning magical powers to blind individuals who could somehow perceive images despite their handicap.

[†]Dr. Claudio Benski, Ph.D., was a physicist and Secretary General of the French Committee for the Study of Paranormal Phenomena (CFEPP). He was also a magician and member of the French Association of Magic Artists (AFAP). Dr. Benski died of leukemia on November 12, 1997, after this article was in final form. The CRSSA (Defense Medical Research Center of the French Ministry of Defense) team was composed of: Dr. Christian Raphel, M.D., Ph.D., psychologist; Dr. Philippe Stivalet, M.D., Ph.D., psychologist; Dr. Corinne Cian, Ph.D., psychologist; Dr. Dominique Esquivié, M.D., psychologist; Dr. Alain Buguet, M.D., Ph.D., neurophysiologist; Dr. Jacques Viret, M.D., Ph.D., biophysicist; Dr. Patrick Masson, Ph.D., biochemist. Direct correspondence to Dr. Christian Raphel, Psychology Unit, Centre de Recherches du Service de Santé des Armées, BP 87, 38702 La Tronche cedex, France.

Dr. Claudio Benski (left) and CRSSA scientists prepare subject Denis S. for the test.

Thus, Tiresias was a blind seer in Greek mythology, and the Jewish commentator Isaac ben Abraham, known as Isaac the Blind, was claimed to have had supernatural visions, achieved through deep concentration, in early thirteenth-century France. More recently, some mediums in the nineteenth century performed their acts while blindfolded. This was also true of some famous magicians: Jean Eugène Robert Houdin, the famous French magician of the 1800s, had a blindfold act with his son Emile. It was only natural that conjurers would come to expose many mediums as flimflam artists who were deceiving gullible audiences. Milbourne Christopher, a well-known magician, gives a nice and colorful account of some of these deceptions (Christopher 1975).

In 1963 and 1964, some Russian women were reported by the popular media as being able to see objects and images while wearing various contraptions over their eyes, presumably to prevent them from using their normal eyesight. A very illuminating discussion of these tests and the credulous reactions of the mainstream press was published by Martin Gardner in 1966 (Gardner 1966). Many of these women had been caught "peeking," and it would have been reasonable to expect that after more than thirty years these paranormal claims would fade away without ever resurfacing again. Wrong! Not only is DOP back, but, whereas previously DOP was claimed to be an innate ability, allegations are made now that DOP can be taught to anyone who pays the requested fees. A Russian company is offering to train people to give sight back to severely vision impaired individuals and even to restore vision to the blind, all through DOP techniques. The implication has excited the interest of several French ophthalmologists and neurologists who have tested two Russian subjects presented by this company and were amazed by their ability to see images apparently without using their eyes, since both subjects were blindfolded. These tests were conducted in Paris in 1996 without the involvement of any conjurer.

This article is a report on a new series of tests on these Russian subjects. Scientists from Grenoble, France, conducted further experimental work on the subjects. However, contrary to the tests in Paris, this time the tests were carried out under the supervision of a magician. The first author of this article, in addition to having a Ph.D. in physics (practically useless for this job) also happens to be a conjurer.

Background

Early in 1996, the Public Health and Epidemiological Intervention Group (GISPE, in French), a private nonprofit organization in Paris, arranged for a series of experiments with "experts" in DOP from a Russian company called the "BUKVA-A Research and Experimentation Center." This company claimed, among many other unusual talents, to be able to train subjects to see while wearing a blindfold. Their own literature explains how they can train instructors to develop DOP in just one week. These instructors would in turn be able to restitute visual abilities to blind people.

The experiments were carried out in Paris by an ophthalmologist, a neurologist, and a radiologist from two leading state research laboratories, one of them at a major hospital. Although they have kindly made available their final report, these scientists have requested that we do not reveal their identity, and we have decided to accept their request for anonymity. They tested two expert subjects from BUKVA-A in March 1996. The tests included nuclear magnetic resonance imagery and EEG with and without a blindfold. Typical ophthalmologic tests were also included. During the tests, brain activity in visual areas was detected but, because the subjects were blindfolded, the report states that this activity was obtained "without recourse to the usual visual pathways." Finally, the report concludes: *"In the absence of any usual visual means, the two subjects were shown to exhibit real visual perception as proven by the reading and visual acuity tests."* This ability is called "outstanding" (*"hors normes,"* in French), and the researchers use the words *fundamental discovery* to describe their accomplishments. This time, DOP seemed to have been found.

Obviously, independent confirmatory experiments were needed. This is how scientists from the Defense Medical Research Center of the French Ministry of Defense in Grenoble (CRSSA, in French) received and accepted a request from GISPE to perform further tests on these subjects in early 1997.

For the confirmatory experiments, a group consisting of the two subjects and a BUKVA-A company representative, Ms. Irina Savkina, arrived in Grenoble in May 1997. Another individual, introduced as a Franco-Russian translator and M.D., completed the group. They claimed they could show their DOP talents to any interested scientist. Thus, a team of scientists from CRSSA and a physicist, who served as a consultant conjurer, was assembled. Although this Grenoble team was asked to investigate the basic DOP claim, the fact is the BUKVA-A literature makes even more amazing claims than "simple" DOP. For example, their blindfolded "expert" would be able "to describe in a precise way the surrounding environment, read texts and even perceive details, which could not be differentiated otherwise through normal vision." This fabulous ability is called in the BUKVA-A literature "four-dimensional

vision." Were it not for the fact that these subjects were certified to have these astonishing faculties by two extremely well known Parisian laboratories, we would have dismissed these claims as hot air.

An often-heard statement appears in their brochure with a new twist: "Specialists confirm that human possibilities in this domain are huge. Each one of us uses only 5 percent of his capacities." (This percentage used to be 10 percent, but we are not aware of any evidence supporting either percentage.) The promised results were truly amazing, although no clue was given as to who these specialists might be or where their findings have been published. Instead, publications with titles like "The Maximum Entropy Formalism" or "Turbulent Movement and Chaos Structure" were quoted to lend scientific credibility to their literature. "Techno-babble" has been used in the past to justify miraculous claims and is always a clear indicator that fake science is being disguised to pass as honest research. However, none of the above constituted bulletproof evidence that the BUKVA-A skills were faked.

The Protocol

Following in the footsteps of Gardner (1966) and Randi[1] (1991), we prepared a protocol that was presented to Ms. Savkina on May 5, 1997. Her acceptance of this protocol was considered a necessary condition, without which we would not agree to conduct the experiments. On the other hand, if it was accepted, we were morally obliged to conduct the tests and certify the results, whatever the outcome. Therefore, it was essential that any possibility of cheating be excluded from the tests by a carefully constructed protocol. We elaborated ten critical points for this protocol. Each one of these points corresponded to a particular safeguard. We reproduce these ten points below:

1. The evaluation of the perceptive abilities of the tested subjects shall be judged by their ability to recognize a dozen unambiguous and easy-to-describe images presented on a video screen and/or paper, as chosen by the experimenters.
2. The subjects shall give the correct identification of *each* displayed image within fifteen seconds after their appearance and using a single unambiguous word.
3. If, during the above fifteen seconds, the subject remains silent or uses speech that does not include the word that designates the object, the answer will be considered as null and the experiment declared a failure.
4. The recognition tests will be conducted only in the presence of the experimenters and the subject. No other individual, in particular no one from the BUKVA-A company, will be admitted in the room during the tests.
5. During the tests, the scientists will have the right to:
   a. select their own Russian translator to interact with the subjects,
   b. select the venue of the tests,
   c. use whatever means they judge appropriate to blindfold the subjects.
6. The whole procedure shall be recorded with a video camera so as to keep a record of the experiment.
7. The subjects shall respect the rules of this experiment; in particular, they will not use their hands during the test or touch their faces.
8. Any failure to abide by these rules shall signify the immediate cessation of the experiment.
9. The scientists and the BUKVA-A company represented by Ms. Irina Savkina agree to sign the final report of these experiments, in particular, successes and failures.
10. Each side authorizes the other to freely publish the outcome of this experiment using only the results detailed and signed by both parties in the final report.

We think that the above protocol contains sufficient safeguards for this type of test. Because some of these safeguards may be new to some readers, we offer the following comments for consideration.

Points 1 and 2 are intended to exclude vague words that might be counted as a success when, in fact, nothing is seen. Consider the images of the Eiffel Tower, a nose, a wire hanger, or a pizza slice. All of these very different objects could be described by the single word *triangle*. If unambiguous words were not excluded, anyone might produce amazing hits without possessing any special skills. That would be an underestimation of the probability of success by chance alone. In this experiment, it was impossible to numerically evaluate this probability, but we wanted to keep it as small as possible. It is indeed impossible to compute the probability that an individual will say a word like *cigar* by sheer chance. But all the images were selected so that any individual authentically seeing an image by whatever means would utter a simple, descriptive noun to describe it and not a complex sentence or a vague and general word. Two typical images of this kind are shown in Figure 1:

Figure 1. Two unambiguous images

Nobody actually *seeing* the images of Figure 1 would need to use convoluted sentences or vague and general words to describe them under the conditions of this test. They should normally elicit the words *scissors* and *hanger*.

Points 2 and 3 are intended to exclude misdirection, possible when very long identification times allow for distractions. The experimenters defended this position arguing that if DOP was equivalent to normal eyesight, as claimed, fifteen seconds

was more than enough to produce a correct identification. For each subject, the test would thus last three minutes (12 images x 15 seconds) at most. Notice that only when each and all of the images have been correctly identified can the test's outcome be called a success.

Points 4 and 5 were added to exclude confederates from *helping the subjects through hidden transmitters or codes.* Furthermore, peeking through a blindfold was prevented by reserving the blindfolding for the experimenters, as allowed by point 5c. About an inch of stacked cotton disks (Demak'up brand) were used to cover each eye orbit with the eyelids closed. Over this stack, an appropriate square of aluminum foil was taped around the orbits with surgical tape (3M Micropore). This tape has several advantages: it is hypoallergenic, and its sticking characteristics make it hard to shift without being caught. In addition, contrary to ordinary tape, its white color makes it clearly visible, should it ever be displaced. This assured an airtight blindfold that left the entire forehead free, an advantage if the subjects were truly using DOP as claimed. In addition, this is a particularly light and comfortable kind of blindfold. However, no description of this blindfolding technique was given during the signing of the protocol. The experimenters felt it was better to withhold this information until the last minute, since it was irrelevant to true DOP subjects but could be used by dishonest ones.

Point 6 was essential since the videotape constitutes the hard evidence of either success or failure at the end of the experiments.

Although we were confident of the efficiency of our blindfolding technique, points 7 and 8 were designed to prevent the subjects from partially removing a small part of the sealing tape during the experiment. Some subjects, under the pretense of discomfort, scratching, etc., have used this subterfuge in the past.

Points 9 and 10 insured that, whatever the outcome, the BUKVA-A company as well as the experimenters would be morally obligated to accept its consequences.

What was not mentioned in the protocol, but was nevertheless implemented during the actual tests, was a question asked to each subject before and after their blindfold was securely in place. The question was: "Are you totally comfortable and optimally able to succeed in identifying the images that we are going to display now?" This question was asked *twice* to each subject to make sure that no excuses of any sort could be given *after* the experiment in case of failure. Had a subject answered negatively, we would not have started the test. We knew that a success would be counted as such, but a failure could always be blamed on whatever problem was mentioned before the test. We will see how critical this point is in the discussion of the results. The decision to ask this question was made by the experimenters during the discussions leading to the elaboration of the protocol.

The Experiment

On the day after the signing of the protocol, the BUKVA-A team, consisting of Ms. Savkina, the translator, and the two subjects, was led to the house of one of the researchers. They were all put in one room. The experimenters were waiting in another room with the video camera in place and the blindfolding material ready but concealed. In addition, a portable computer was lying on a table on top of a thick stack of books so that its screen would be at eye level for a subject sitting in front of it. A psychologist, who needed only to click the mouse to have the images retrieved one by one, would operate it. The images chosen for the experiment are shown in Tables 1 and 2. They were shown in full-screen and high resolution mode.

Displayed Image	Expected word	Word used by subject 1
	Watering-can	House
	Banana	Sun
	Rooster	Pathway
	Mouse	Subject declared she could not see
	Table	Car
	Egg	Paper
	Trumpet	Tree
	Pants	Circle
	Monkey	Pencil
	Tent	Subject declared *she could not see*
	Eyeglasses	Court
	Pincers	Rectangle

Table 1. Responses of Helena B.

The experimenters had previously obtained the help of an independent native Russian translator to interact with the subjects. For reasons that will become clear later, we placed some flimsy tissue blindfolds clearly visible on top of the table, although we obviously never intended to use them.

The first subject presented by BUKVA-A was Helena B., a twenty-two-year-old woman. Once she clearly stated that she was willing and able to begin the experiment, the cotton stacks were placed on her eye orbits. Then, a doctor member of our team taped the pieces of aluminum foil over the eyes of Helena B. Again she was asked whether she was comfortable and

Displayed Image	Expected word	Word used by subject 2
	Wheelbarrow	Dog
	Car	House
	Rose	Fence
	Airplane	Man
	Bicycle	Animal
	Guitar	Sun
	Butterfly	Cube
	Cigar	Bottle
	Chair	Mountain
	Scissors	Subject declared he could not see
	Cake	Triangle
	Step-ladder	Candle

Table 2. Responses of Denis S.

whether she believed that she could fully succeed in the test. The answer was yes again. We explained to her that we would say "Image" each time a new image appeared on the computer screen, filling it completely. The Russian translator would then translate "Image" into Russian and, from that point on, she had fifteen seconds to utter the word best describing the displayed image. Once she said the word, the translator would translate that word into French, the portable computer would be turned around to expose its screen to the recording video camera, and the next image would be retrieved. In addition to the video camera, two researchers took written notes of the displayed images and noted the corresponding subject words. The results for the first subject are shown in Table 1.

Clearly, there was total discordance between the images and their identification. Notice that, contrary to the protocol, this subject used general words like *circle*, *rectangle*, or *paper*. Had we shown a book with a sun on its cover, any one of these three words could have been used to describe this image. That the subject was merely guessing was clearly revealed by the fact that, after pronouncing the word for the second image, while the computer disk drive was still spinning in search of the third image, the subject described the blank screen as a "triangle" without waiting for the "Image" command. Not only was she unable to identify any of the presented images, but she also thought she was able to "see" even though there was nothing to be seen! This event was not recorded in Table 1, where only the displayed images are listed, but it is worth mentioning. Notice also that none of the words pronounced by Helena B. fit any of the images displayed.

After Helena B. finished with the last image, she was thanked, her blindfold removed, and she was escorted to another room without any clue as to the results of her test. She remained there, accompanied by one of the researchers, while the second subject was being tested. This precaution was meant to prevent the second subject from refusing to be tested upon knowing of the first subject's failure.

The second subject, Denis S., a fifteen-year-old boy, was led into the experiment room only when the first subject had already been escorted out. Otherwise, the experimental sequence was similar to the first one with one exception: Denis S. was given the choice of whether he preferred the images to be shown on the computer screen or on paper. He clearly stated that he preferred the computer screen. We should point out that this subject was quoted by the BUKVA-A literature as an "expert" who could read or see a TV screen while blindfolded. Thus, he was expected to be better at DOP than ordinary BUKVA-A trainees.

When asked whether he was completely comfortable with our blindfold, he declared that some of the tapes on his face gave him some discomfort. These tapes were promptly replaced and only when he stated that nothing was interfering with his abilities did the test start. The video-recording camera was set and the test ran as before. Its pace was comparable to the first one, and the run was over in somewhat less than the three allotted minutes. The results of the test with Denis S. are shown in Table 2.

Notice that the second subject also used general words, sometimes the same ones as the first one. But again, there was total discordance between the displayed images and the words used to describe them. Even allowing for reordering of the words, none of the elicited responses corresponded to *any* of the images displayed if the general words are excluded.

As before, the subject was thanked and the blindfold removed without any further comments. At that point, the experimenters called in Ms. Irina Savkina, her translator, and the two subjects. They were shown the images used during the tests and read the exact contents of the last columns of Tables 1 and 2. They were told that both tests had been recorded on tape for them to see if they so wished. They declined the offer. The final report was typed immediately after that, and Ms. Savkina was asked if she was willing to accept that "both subjects had completely failed the tests when properly blindfolded." She agreed but claimed that it was the first time in four years that her subjects had failed a test. She offered as a possible explanation the fact that we had used aluminum foil. We answered that neither of her two subjects objected to the aluminum foil before or during the tests. She then suggested

Blindfolded test subject Helena B.

Blindfolded test subject Denis S.

that the fact that we used a computer screen might have been the cause of failure. Because of the protocol's Point 1, we could answer that, on the eve of the experiment, she had accepted the computer screen as a valid medium. Furthermore, Denis S. had voluntarily selected the computer screen as opposed to a sheet of paper.

All of Ms. Savkina's excuses could be answered because both subjects were asked *before* the test whether they were under optimal conditions to succeed as explained before. She then made a last ditch effort. She requested a repetition of the test using one of the blindfolds lying on the table. We knew those blindfolds to be *very unreliable*, and probably the BUKVA-A people knew that too. We had left these blindfolds lying on the table because we thought that an honest but self-deluded individual would not request or accept to wear these unreliable blindfolds for this kind of experiment. We believe that, whenever possible, the honesty of a paranormal claimant should be tested by intentionally allowing the possibility of cheating in a controlled instance and seeing whether the subject takes advantage of this opportunity. Faced with this request, we answered that no repetition was mentioned in the signed protocol and that, in any event, a new one would have to be prepared if that were to happen. Also, we pointed out that it was the GISPE who requested the expertise, and it would be up to them to request a new test. As far as the researchers were concerned, the whole experiment was finished. The consequence was unavoidable: the signing of the final report recognizing that no evidence of DOP had been found.

Conclusions

We feel that the ten-point protocol constructed for this experiment contains guidelines that may help other researchers involved in testing similar claims. Also, the expert help of a conjuring artist is, in this case, more useful than the most sophisticated hi-tech gear to measure brain waves. According to our final report, signed by all parties, out of a total of twenty-four images, none were identified by the blindfolded subjects. This is a clear indication that, when suitably blindfolded, the BUKVA-A experts lose all the amazing abilities that so impressed the medical experts in Paris.

The visual system is indeed a very complex one. In a wonderful book, J. P. Frisby (1980) describes the intricacies of the eyesight system at a very accessible level. One cannot help but read in sheer awe about the sophisticated mechanisms of the natural vision system. We are also aware of several honest research projects aimed at implanting an artificial electronic retina in the eye to help restore vision to the blind.[2] Compared to natural vision or the possibility of electronically aided vision, DOP is just a claim masquerading as science by abusing scientific language, like so many other claims discussed and debunked in this publication.

It is very difficult, often impossible, to prove a negative assertion such as "DOP does not exist." However, under rigorous scientific tests, including this one, no evidence has ever been presented for DOP that could withstand careful scrutiny. Until that evidence is shown, we believe that giving financial support to individuals or companies claiming success in training for DOP is a total waste of money and resources.

Acknowledgments

We wish to thank Ms. Galina Khaletzky for her valuable help in translating from and into Russian during the experiments.

Notes

1. A general protocol for testing paranormal claims is given in James Randi's Psychic Challenge. Its description can be found on Randi's Web site: http://www.randi.org/jr/chall.html.

2. See, for example, the Web site http://www.coe.ncsu.edu/news.releases/liu.retina.htm, where a description of ongoing work on an artificial retina component chip (ARCC) is given.

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Magnetic Water and Fuel Treatment: Myth, Magic, or Mainstream Science?

Magnetic treatment has been claimed to soften water and improve the combustibility of fuels. A literature review reveals that these claims are not well supported by data.

MIKE R. POWELL

Magnets are not just for refrigerators any more. In fact, according to some magnet vendors, magnets can be used to improve blood circulation, cure and prevent diseases, increase automobile mileage, improve plant growth, soften water, prevent tooth decay, and even increase the strength of concrete. Some of these claims are backed by experimental evidence. Many are not. This article focuses specifically on the claimed benefits of magnetically treated fuel and water.

Most magnetic water and fuel treatment systems appear to be marketed through independent distributors who sell out of their homes. An Internet search using the keywords *magnetic treatment* reveals dozens of independent distributor home pages. Very few such devices are offered by national chain stores or advertised in mail-order catalogs. Possibly, the magnetic-device manufacturers sell through independent distributors to insulate themselves from some of the

more exotic claimed benefits of magnetic treatment, or perhaps consumer and wholesaler skepticism has kept magnetic treatment out of mainstream retail. Regardless of the reasons, magnetic water and fuel treatment devices are not usually available at the local hardware or automobile parts supply store. This lack of wide availability has given magnetic water and fuel treatment a sort of fringe-science status in the minds of many consumers. Whether this label is deserved is the subject of this article.

Claimed Benefits and Effects

The claimed benefits of magnetic water treatment vary depending on the manufacturer. Some claim only that magnetic treatment will prevent and eliminate lime scale in pipe and heating elements; others make additional, more extravagant claims. Some of the additional claims include water softening, improved plant growth, and the prevention of some diseases in people who consume magnetically treated water. Magnetic water treatment devices consist of one or more magnets, which are clamped onto or installed inside the incoming residential water supply line. Typical costs for a residential installation range from about $100 to $600 or more.

Magnetic fuel treatment devices are constructed similarly. One or more magnets are clamped around or installed inside an automobile's engine fuel line between the gas tank and the carburetor (or fuel injectors). Claims for these devices include decreased hazardous gas emissions, more complete combustion, improved engine power, longer-lasting engine components, and a 10 percent to 20 percent increase in gas mileage. Prices for automotive fuel treatment magnets range from about $50 to $300.

The distributors of these devices rarely can cite any documented test results that validate these claims. Instead, they rely on numerous testimonials, lists of corporations and municipalities that purportedly use the devices, and scientific-sounding explanations of magnetic water and fuel treatment. However, just because distributors do not cite the literature does not mean that no relevant literature exists. Published test reports and journal articles that investigate magnetic treatment are available. This article reviews the available experimental evidence for magnetic water and fuel treatment.

Magnets and Magnetism

To many people, magnets are a complete mystery. Vendors of magnet-based scams often use this ignorance to their own advantage, so a familiarity with the basics of magnetism can aid in the detection of dubious claims.

Magnetic fields are produced by the motion of charged particles. For example, electrons flowing in a wire will produce a magnetic field surrounding the wire. The magnetic fields generated by moving electrons are used in many household appliances, automobiles, and industrial machines. One basic example is the electromagnet, which is constructed from many coils of wire wrapped around a central iron core. The magnetic field is present only when electrical current is passed through the wire coils.

Permanent magnets do not use an applied electrical current. Instead, the magnetic field of a permanent magnet results from the mutual alignment of the very small magnetic fields produced by each of the atoms in the magnet. These atomic-level magnetic fields result mostly from the spin and orbital movements of electrons. While many substances undergo alignment of the atomic-level fields in response to an applied magnetic field, only ferromagnetic materials retain the atomic-level alignment when the applied field is removed. Thus, all permanent magnets are composed of ferromagnetic materials. The most commonly used ferromagnetic elements are iron, cobalt, and nickel.

The strength of a magnet is given by its magnetic flux density, which is measured in units of gauss. The earth's magnetic field is on the order of 0.5 gauss (Marshall and Skitek 1987). Typical household refrigerator magnets have field strengths of about 1,000 gauss. According to the distributors, the magnets sold for water and fuel treatment have magnetic flux densities in the 2,000 to 4,000 gauss range, which is not unusually strong. Permanent magnets with flux densities in the 8,000 gauss range are readily available. The magnets sold for magnetic fuel and water treatment are nothing special; they are just ordinary magnets.

Water Hardness

The phrase *hard water* originated when it was observed that water from some sources requires more laundry soap to produce suds than water from other sources. Waters that required more soap were considered "harder" to use for laundering.

Water "hardness" is a measure of dissolved mineral content. As water seeps through soil and aquifers, it often contacts minerals such as limestone and dolomite. Under the right conditions, small amounts of these minerals will dissolve in the ground water and the water will become "hard." Water hardness is quantified by the concentration of dissolved hardness minerals. The most common hardness minerals are carbonates and sulfates of magnesium and calcium. Water with a total hardness mineral concentration of less than about 17 parts per million (ppm) is categorized as "soft" by the Water Quality Association (Harrison 1993). "Moderately hard" water has a concentration of 60 to 120 ppm. "Very hard" water exceeds 180 ppm.

Hard water is often undesirable because the dissolved minerals can form scale. Scale is simply the solid phase of the dissolved minerals. Some hardness minerals become less soluble in water as temperature is increased. These minerals tend to form deposits on the surfaces of water heating elements, bathtubs, and inside hot water pipes. Scale deposits can shorten the useful life of appliances such as dishwashers. Hard water also

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increases soap consumption and the amount of "soap scum" formed on dishes.

Many homeowners and businesses use water softeners to avoid the problems that result from hard water. Most water softeners remove problematic dissolved magnesium and calcium by passing water through a bed of "ion-exchange" beads. The beads are initially contacted with a concentrated salt (sodium chloride) solution to saturate the bead exchange sites with sodium ions. These ion-exchange sites have a greater affinity for calcium and magnesium, so when hard water is passed through the beads the calcium and magnesium ions are captured and sodium is released. The end result is that the calcium and magnesium ions in the hard water are replaced by sodium ions. Sodium salts do not readily form scale or soap scum, so the problems associated with hard water are avoided.

A 1960 survey of municipal water supplies in one hundred U.S. cities revealed that water hardness ranged from 0 to 738 ppm with a median of 90 ppm (see Singley 1984). Ion-exchange water softeners are capable of reducing the hardness of the incoming water supply to between 0 and 2 ppm, which is well below the levels where scale and soap precipitation are significant.

One of the principal drawbacks of ion-exchange water softeners is the need to periodically recharge the ion exchange beads with sodium ions. Rock salt is added to a reservoir in the softener for this purpose.

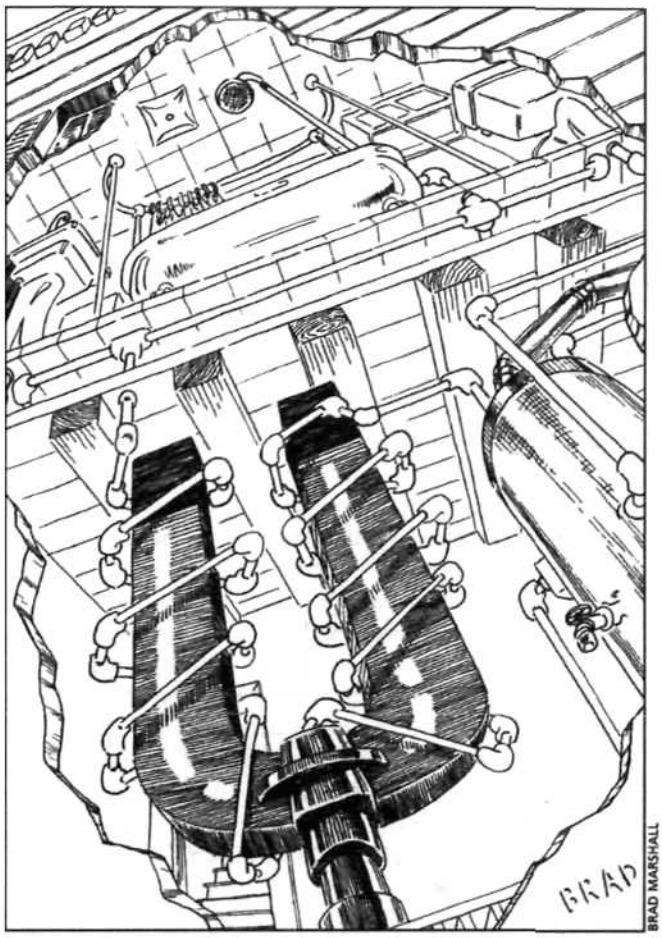
Magnetic Water Treatment

A wide variety of magnetic water treatment devices are available, but most consist of one or more permanent magnets affixed either inside or to the exterior surface of the incoming water pipe. The water is exposed to the magnetic field as it flows through the pipe between the magnets. An alternative approach is to use electrical current flowing through coils of wire wrapped around the water pipe to generate the magnetic field.

Purveyors of magnetic water treatment devices claim that exposing water to a magnetic field will decrease the water's "effective" hardness. Typical claims include the elimination of scale deposits, lower water-heating bills, extended life of water heaters and household appliances, and more efficient use of soaps and detergents. Thus, it is claimed, magnetic water treatment gives all the benefits of water softened by ion-exchange without the expense and hassle of rock-salt additions.

Note that only the "effective" or "subjective" hardness is claimed to be reduced through magnetic treatment. No magnesium or calcium is removed from the water by magnetic treatment. Instead, the claim is that the magnetic field decreases the tendency of the dissolved minerals to form scale. Even though the dissolved mineral concentration indicates the water is still hard, magnetically treated water supposedly behaves like soft water.

According to some vendors, magnetically softened water is healthier than water softened by ion exchange. Ion-exchange softeners increase the water's sodium concentration, and this,



BRAD MARSHALL

they claim, is unhealthy for people with high blood pressure. While it is true that ion-exchange softening increases the sodium concentration, the amount of sodium typically found even in softened water is too low to be of significance for the majority of people with high blood pressure. Only those who are on a severely sodium-restricted diet should be concerned *about the amount of sodium in water, regardless of whether it* is softened (Yarows et al. 1997). Such individuals are often advised to consume demineralized water along with low-salt foods.

There is apparently no consensus among magnet vendors regarding the mechanisms by which magnetic water treatment occurs. A variety of explanations are offered, most of which involve plenty of jargon but little substance. Few vendors, if any, offer reasonable technical explanations of how magnetic water treatment is supposed to work.

The important question here, though, is whether magnetic water treatment works. In an effort to find the answer, I conducted a search for relevant scientific and engineering journal articles. I describe the results of this search below.

More than one hundred relevant articles and reports are available in the open literature, so clearly magnetic water treatment has received some attention from the scientific community (e.g., see reference list in Duffy 1977). The reported effects of magnetic water treatment, however, are varied and often contradictory. In many cases, researchers report finding

no significant magnetic treatment effect. In other cases, however, reasonable evidence for an effect is provided.

Liburkin et al. (1986) found that magnetic treatment affected the structure of gypsum (calcium sulfate). Gypsum particles formed in magnetically treated water were found to be larger and "more regularly oriented" than those formed in ordinary water. Similarly, Kronenberg (1985) reported that magnetic treatment changed the mode of calcium carbonate precipitation such that circular disc-shaped particles are formed rather than the dendritic (branching or tree-like) particles observed in nontreated water. Others (e.g., Chechel and Annenkova 1972; Martynova et al. 1967) also have found that magnetic treatment affects the structure of subsequently precipitated solids. Because scale formation involves precipitation and crystallization, these studies imply that magnetic water treatment is likely to have an effect on the formation of scale.

Some researchers hypothesize that magnetic treatment affects the nature of hydrogen bonds between water molecules. They report changes in water properties such as light absorbance, surface tension, and pH (e.g., Joshi and Kamat 1966; Bruns et al. 1966; Klassen 1981). However, these effects have not always been found by later investigators (Mirumyants et al. 1972). Further, the characteristic relaxation time of hydrogen bonds between water molecules is estimated to be much too fast and the applied magnetic field strengths much too small for any such lasting effects, so it is unlikely that magnetic water treatment affects water molecules (Lipus et al. 1994).

Duffy (1977) provides experimental evidence that scale suppression in magnetic water treatment devices is due not to magnetic effects on the fluid, but to the dissolution of small amounts of iron from the magnet or surrounding pipe into the fluid. Iron ions can suppress the rate of scale formation and encourage the growth of a softer scale deposit. Busch et al. (1986) measured the voltages produced by fluids flowing through a commercial magnetic treatment device. Their data support the hypothesis that a chemical reaction driven by the induced electrical currents may be responsible for generating the iron ions shown by Duffy to affect scale formation.

Among those who report some type of direct magnetic-water-treatment effect, a consensus seems to be emerging that the effect results from the interaction of the applied magnetic field with surface charges of suspended particles (Donaldson 1988; Lipus et al. 1994). Krylov et al. (1985) found that the electrical charges on calcium carbonate particles are significantly affected by the application of a magnetic field. Further, the magnitude of the change in particle charge increased as the strength of the applied magnetic field increased.

Gehr et al. (1995) found that magnetic treatment affects the quantity of suspended and dissolved calcium sulfate. A very strong magnetic field (47,500 gauss) generated by a nuclear magnetic resonance spectrometer was used to test identical calcium sulfate suspensions with very high hardness (1,700 ppm on a $CaCO_3$ basis). Two minutes of magnetic treatment decreased the dissolved calcium concentration by about 10 percent. The magnetic field also decreased the average particle charge by about 23 percent. These results, along with those of many others (e.g., Parsons et al. 1997; Higashitani and Oshitani 1997), imply that application of a magnetic field can affect the dissolution and crystallization of at least some compounds.

Whether or not some magnetic water treatment effect actually exists, the further question, and the most important for consumers, is whether the magnetic water treatment devices perform as advertised.

Numerous anecdotal accounts of the successes and failures of magnetic water treatment devices can be found in the literature (Lin and Yotvat 1989; Raisen 1984; Wilkes and Baum 1979; Welder and Partridge 1954). However, because of the varied conditions under which these field trials are conducted it is unclear whether the positive reports are due solely to magnetic treatment or to other conditions that were not controlled during the trial.

Some commercial devices have been subjected to tests under controlled conditions. Unfortunately, the results are mixed. Duffy (1977) tested a commercial device with an internal magnet and found that it had no significant effect on the precipitation of calcium carbonate scale in a heat exchanger. According to Lipus et al. (1994), however, the scale prevention capability of their ELMAG device is proven, although they do not supply much supporting test data.

Busch et al. (1997) measured the scale formed by the distillation of hard water with and without magnetic treatment. Using laboratory-prepared hard water, a 22 percent reduction in scale formation was observed when the magnetic treatment device was used instead of a straight pipe section. However, a 17 percent reduction in scaling was found when an unmagnetized, but otherwise identical, device was installed. Busch et al. (1997) speculate that fluid turbulence inside the device may be the cause of the 17 percent reduction, with the magnetic field effect responsible for the additional 5 percent. River water was subjected to similar tests, but no difference in scale formation was found with and without the magnetic treatment device installed. An explanation for this negative result was not found.

Another study of a commercial magnetic water treatment device was conducted by Hasson and Bramson (1985). Under the technical supervision of the device supplier, they tested the device to determine its ability to prevent the accumulation of calcium carbonate scale in a pipe. Very hard water (300 to 340 ppm) was pumped through a cast-iron pipe, and the rate of scale accumulation inside the pipe was determined by periodically inspecting the pipe's interior. Magnetic exposure was found to have no effect on either the rate of scale accumulation or on the adhesive nature of the scale deposits.

Consumer Reports magazine (Denver 1996) tested a $535 magnetic water treatment device from Descal-A-Matic Corporation. Two electric water heaters were installed in the home of one of the *Consumer Reports* staffers. The hard water (200 ppm) entering one of the heaters was first passed through the magnetic treatment device. The second water heater received untreated water. The water heaters were cut open after

more than two years and after more than 10,000 gallons of water were heated by each heater. The tanks were found to contain the same quantity and texture of scale. *Consumer Reports* concluded that the Descal-A-Matic unit was ineffective.

Much of the available laboratory test data imply that magnetic water treatment devices are largely ineffective, yet reports of positive results in industrial settings persist (e.g., Spear 1992; Donaldson 1988). The contradictory reports imply that if a magnetic water treatment effect for scale prevention exists, then it only is effective under some of the conditions encountered in industry. At present, there does not seem to be a defensible guideline for determining when the desired effect can be expected and when it cannot.

One of the claims made for residential magnetic treatment devices is that less soap and detergent will be required for washing. Compared to the claim to suppress scale formation, this claim has received little direct attention in the literature. To decrease soap and detergent consumption, the concentration of dissolved hardness minerals must be decreased. The tests by Gehr et al. (1995), described earlier, demonstrated a decrease in dissolved mineral concentration of about 10 percent. If this fractional decrease in dissolved mineral concentration is representative of that obtained by magnetic treatment, then it is unlikely that soap and detergent use will be significantly reduced. For example, given a water supply with 100 ppm dissolved hardness, magnetic treatment would only be expected to reduce the hardness to 90 ppm, assuming the results of Gehr et al. can be applied at this hardness concentration.

Is there a beneficial effect of magnetic water treatment? Perhaps.

Is there sufficient evidence of a beneficial effect to warrant spending hundreds of dollars on a residential magnetic water treatment unit? Unlikely. The understanding of magnetic water treatment must first be developed to the point where the effects of magnetic treatment can be reliably predicted and shown to be economically attractive.

Does magnetic water treatment perform as well as ion-exchange treatment? Definitely not. At present, the conventional water softening technologies are clearly much more reliable and effective. Further, the initial cost of an ion-exchange water softener (around $500) is comparable to that of many magnetic treatment systems.

Magnetic Fuel Treatment

Magnetic fuel treatment devices installed in automobiles are similar in design to magnetic water treatment devices. Hydrocarbon fuel is pumped through a canister containing one or more magnets or a magnetic device is clamped to the external surface of the fuel line. Magnetic treatment of fuel, it is claimed, results in increased horsepower, increased mileage, reduced hazardous gas emissions, and longer engine life.

Typically, vendors claim that either mileage or horsepower will be improved by about 10 to 20 percent. They also claim that if no improvement in mileage is noted, then the improvement must have come in the form of more horsepower. This, of course, makes it difficult for consumers to determine whether their magnetic fuel treatment devices really are working.

A literature search for magnetic fuel treatment studies revealed that such studies are practically nonexistent. I found a total of three references. Two of these (Daly 1995; McNeely 1994) were anecdotal accounts describing the use of a magnetic treatment device to kill microorganisms in diesel fuel, a fuel treatment application not usually mentioned by magnetic fuel treatment vendors.

The third reference (Tretyakov et al. 1985) describes tests conducted in which the electrical resistance and dielectric properties of a hydrocarbon fuel were found to change in response to an applied magnetic field. This report does not address whether the observed physical property changes might affect fuel performance in an engine, but it references two research reports that may contain performance data (Skripka et al. 1975; Tretyakov et al. 1975). Unfortunately, I could obtain neither report, and both are written in Russian.

My literature search search found no other credible research reports pertaining to magnetic fuel treatment.

The utter lack of published test data is revealing. According to the vendors, magnetic fuel treatment has been around for at least fifty years. If it actually worked as claimed, it seems likely that it would by now be commonplace. It is not.

Vendors of magnetic fuel treatment sometimes respond to this reasoning with hints that the automobile manufacturers and big oil companies are conspiring to suppress magnetic fuel treatment to maintain demand for gasoline. Such a conspiracy seems quite improbable. This supposed conspiracy has not managed to suppress other fuel-saving innovations such as fuel injection and computerized control.

In summary, I found no test data that support the claims for improved engine performance made by vendors of magnetic fuel treatment devices. Until such data become available, considerable skepticism is justified. At present, it seems quite unlikely that any of the claimed benefits of magnetic fuel treatment are real.

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MAGNETIC TREATMENT
continued on page 63

Dowsing the Rollrights

Dowsing may be one case of the phenomenon of "self as unrecognized cause." Other paranormal claims might originate in the same misperception.

P. A. HANCOCK

I recently had the opportunity to visit the Rollright Stones in the southern Midlands of England. This monument, which lies on the border of the counties of Oxfordshire and Warwickshire, is composed of three elements. The main element, known as "The King's Men," is a prehistoric circle (depicted in Figure 1) some 30 meters in diameter and with stones up to 2.2 meters in height. Some 300 meters away is a group of five large stones known as "The Whispering Knights," purportedly the remains of a Neolithic long barrow (a large mound of stones placed over a burial site). Finally, about 50 meters from the main circle, is "The King's Stone," a monolith that appears to bear a relationship to the stone circle not unlike that of the heel stone to the main circle at Stonehenge. Unlike many prehistoric stone circles, the Rollrights stand on privately owned land and are not commercially exploited. (The small entry fee of thirty pence is declaredly donated to an animal charity).

Figure 1. Engraving of the Rollright Stones in the Grand Atlas of 1667 by J. Blaeu.

According to legend, the circle is a group of "King's Men" magically metamorphosed into rocks. One of the most intriguing legends associated with the Rollrights concerns the number of stones in the circle. The "official" number is seventy-two, while the local written guide indicates seventy-seven. The reason for this discrepancy is that the stones themselves are well worn, and it is difficult to tell whether some of the stones are singles or whether they are connected underground, showing different facets of the same stone above ground. Similar claims about not being able to count the number of stones in a circle are made about Castlerigg in Cumberland and Aylesford in Kent, at different ends of England. It is supposedly fortunate that the stones cannot be counted, since legend has it that anyone who correctly counts them three times in a row is in mortal danger.

The Rollright Stones stand on a high ridge above the village of Long Compton in Warwickshire. On the day that I visited, the crown of the hill was covered in low-lying clouds that blew a damp mist across the circle. Upon exiting the surrounding wooded path, I found several individuals engaged in "dowsing" the circle. What they were dowsing the circle *for* was not clear, but it was certainly not a search for water. I was enthusiastically recruited into the collective experience and quickly found myself with some homemade dowsing rods.

Asked to stand at the center of the stone circle, I was assured that I was on a major "ley" line ("energy" line; see Watkins 1925) and that there was considerable "energy" all around the site. Almost immediately after I had been given the dowsing rods and some instruction in their use, I found the rods moving in my hands, apparently beyond my volition and producing strong "signals," indicating some unseen, but certainly "felt" force. There was an immediate outcry of success by the nominal "leader." I felt proud! Others turned admiringly towards me. Did I have special powers? Did I possess some innate capability that set me apart from the ordinary run of common folk? It was a heady and tempting cocktail of admiration, approval, and mystery. Was dowsing the real thing? And was I privileged to enter into an arcane world of esoteric energies? Well, perhaps. It was however, an important opportunity for an insightful look into the appeal of the twilight world.

Decomposing Dowsing

An author of a popular text on dowsing, P. Naylor, has noted:

> During the twentieth century, the art [dowsing] has come into the open, partly because of a lively scientific interest by learned men and a quiescent attitude on the part of the church. Unfortunately, even today, as over the centuries, there is a widely held belief that dowsing is an agency of the devil, and akin to mysticism. This is not so. It is a purely scientific phenomenon which can be used equally well by the saintly as by sinners. (Naylor 1980, 6)

The quotation attests to Naylor's opinion that dowsing is a purely scientific phenomenon. If so, it should be possible to apply a scientific approach to the question of causation in dowsing. In an attempt to understand my particular experience and to try to distill some of the possible underlying causes

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of the rods' movement, I used a decompositional systems approach that has proved helpful in other realms of behavioral investigation (Hancock and Chignell 1995; Newell 1986). In the present case, I divided observations into those related to: 1) the environment (the stone circle), 2) the instrument (the dowsing rods), 3) the actor (the dowser), and finally, 4) the task itself (the goal of dowsing). The approach recognizes the critical importance of the interactions between these elements but looks initially at the influence of each individual component of the system.

The Environment

The environment of the Rollrights was certainly evocative. It was a somewhat windy day, and the effect of a mild breeze on the rods themselves was difficult to establish. The influence was not overwhelming, however, since the rods did not always follow wind direction. The Rollright circle is located in a glade, three sides of which are blocked with high trees, while the fourth, from which the wind was blowing that day, is open to the elements (see Figure 2). As a result, the light wind swirled in the "bowl" made by the trees, and often it was difficult to tell if wind eddies were having an effect. Given that others present experienced no problems and that dowsing is purported to work on still days, the wind cannot be considered the ubiquitous causal influence.

A more problematic source of environmental influence was the uneven ground both within and outside the circle. Considerable effort is needed to focus on the dowsing rods while walking and stepping around irregular obstacles. It clearly complicates the dowser's effort *not* to impart a direct influence on the rods. Like many unfenced stone circles, there is a worn pathway around both the inside and the outside of the stones themselves. In wet and damp conditions, these areas are slippery. Walking on or through them means exerting some caution. Consequently, approaching any stone means dividing one's attention between two tasks at once—overt balancing and dowsing. Movements associated with slowing and stabilizing locomotion as one approaches stones can easily be transmitted to the arms, which are endeavoring to retain the rods in a "perfectly horizontal position" (Naylor 1980).

There is also the possibility of an *a priori* expectation of success (Vogt and Hyman 1959), encouraged by the evocative setting shown in Figure 2. In sum, it is difficult in natural settings to distinguish the influence of recognizable physical environmental influences from other potential sources.

The Instrument

The rods themselves are of particular interest. I learned from one of the dowsers that any metal could be used. Indeed, some advocate wooden instruments or even no instruments at all, as in "hand" dowsing. A particular point was made that either copper or aluminum rods would work even though they are not affected by magnetic fields, implying that dowsing does not rely on some form of magnetic attraction. It has been suggested by Hitching (1978) that dowsing uses some form of electrical force.

Figure 2. A portion of "The King's Men," the Rollright Stones main circle. The misty, evocative setting was conducive to belief in "mystical forces."

The rods I used were two thin bent metal rods, and the handles were two plastic ballpoint pen cases (see Figure 3). I was assured that these handles meant that I could not *consciously* affect the movement of the rods. The rods were some five inches long in the "handle" and some eighteen inches extending forward. Upon examination, I found that neither was bent precisely at a right angle between handle and extension but, being curved in profile, the bend in the rods themselves provided a facile turning surface to interact with the holders. Also, the more reactive of the two rods was distorted horizontally at the bend between the "handle" and the extension. In short, what I held in my hands were two very unstable systems that reacted to the slightest movements. In this sense, the task of the dowser is very similar to a "critical" tracking task (Jex, McDonnell, and Phatak 1966). The latter is the electronic equivalent of balancing a length of wooden dowel in the vertical plane. When the dowel is long, the balancing task is simple. As the length of the dowel is progressively shortened, and the dowel becomes increasingly unstable, the balancing task becomes more difficult.

The "dowser" is also an active, if unwitting, player in creating this instability. In trying to hold the rods parallel to the ground, the dowser makes subtle adjustments on the assumption that the instrument itself is straight and level. Indeed, individuals are instructed to do so. Naylor again:

> When you are fully relaxed, hold the rods, one in each hand, so that the handles are held in loosely clenched fists. Your arms and those rods should point to the ground. Your thumbs should rest on the fingernails of the forefingers. With the rods hanging loosely at your sides, they should swing freely if the hands are moved. Now raise your forearms by bending the elbows, which should be kept close to the trunk of your body. The forearms should be held horizontally, with the arms of the rods also horizontal and handles vertical. Ideally, the arms of the rods and forearms should be in line and perfectly horizontal, on the same plane and parallel with each other.

Such a system is dynamically unstable and even minor perturbations can be magnified into extensive swings of the rod. The longer the extension portion of the rod, the further the

center of mass is from the hands and the more unstable the system. The combination of slight eccentricities in design and postural adjustments on the part of the dowser to keep the rods in position, leaves the rods particularly vulnerable. This interpretation is further supported by the symmetry of movement of the rods, as well as the fact that the rods rarely rotate a full 360 degrees. The overt request to maintain forearm stability, which becomes the focus of the dowser's conscious attention, is combined with the fact that such overt stability is only achieved by the coordination of many subconscious compensatory movements, thus giving impetus to the rods. Dowsing, therefore, provides a most insidious combination of unstable conditions. This combination of conditions applies to other types of dowsing tools such as the forked twig and the pendulum, as elaborated in the excellent text by Vogt and Hyman (1959).

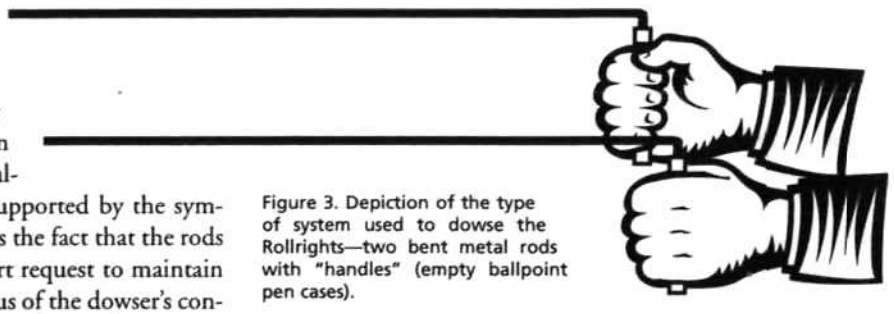

Figure 3. Depiction of the type of system used to dowse the Rollrights—two bent metal rods with "handles" (empty ballpoint pen cases).

The Actor (The Dowser)

If the rods were exceptionally heavy, the ability of the dowser to keep the rods horizontal would be rapidly affected by muscular fatigue. In this case, we would observe that the tremor associated with such fatigue was transmitted to the rods, causing them to move. One would hardly be tempted in such a case to ascribe the movement of the rods to an esoteric force. The causal relation would be clear, in the same way that it was demonstrated for the phenomenon of table turning by Michael Faraday in 1853 (see Faraday 1853). However, as the rods are light, it does not occur to most people to associate the *horizontal* movements of the rod with imperceptible (and by expectation *vertical*) movements of the dowser's arms. Thus, the posture of dowsing and lack of support for the forearms are potentially critical influences.

I was informed that the rods did not need handles for dowsing to be successful, and I was encouraged to try dowsing without them. Here, even more subtle influences come into play. The rods themselves were thin, made from what seemed to be coat-hanger wire. However, rather than using a precision grip between fingers and thumb, as is usual for thin objects, one is instructed to use the same clench-fisted "power" grip as used with the handles, albeit in a "relaxed" manner (see earlier quotation). The expectation is that, being grasped directly, the rods should not move independent of volitional action. However, since the grasp used is inappropriate for the thickness of the object, movement still occurs. When it does, it has a startling effect. The part of the hand used in such a grasp is highly innervated, as shown by the research of Wilder Penfield on the neurosensory homunculus. Therefore, rotational movement in this unusual grasp elicits an intense and novel form of tactile stimulation. While Vogt and Hyman (1959) proposed that subconscious imitation of previously observed dowsing procedures may account for initial rod movement, I suggest that postural stability also plays a crucial role. And since the postural movements are subconscious, but the subsequent effect is so strong, it is not surprising that some external source is invoked to explain the (occasionally profound) sensations experienced.

It is, of course, possible to control the rods consciously. By placing the thumb directly over the point of rotation, or better grasping the long extension of the dowsing rod between fingers and thumb, the movement "magically" disappears. When the instability of the system is removed by changing the grip location, no wide excursions of the rods are observed. Clearly, the esoteric "force" is not able to "overcome" the machinations of such differences in grasp.

Once one has progressed from dowsing with handles to dowsing with just the rods themselves, and putatively assured oneself that the movement of the rods is a response to an external force, it is for some an obvious next step to propose that the force can be "felt" directly and that no rods or other instruments are necessary. Naylor again speculates:

> A very few gifted people are so sensitive that they can dowse using an open hand held palm downwards. They feel a tingling sensation of varying intensity in the hand and fingers. You may be one of those rare people!

Unfortunately, with this proposition, all behavior open to mutual inspection disappears. It was into this trap that introspectionist psychology fell almost a century ago. Similarly, in hand dowsing, we have no overt behavioral measure and frequently no method to provide independent assessment as to whether statements made actually accord with the truth. You may well think it possible to treat this with "light-hearted seriousness," as suggested in the following quotation. I could not possibly comment.

> Dowsers are still in demand, to fill the gaps where modern technology has failed. Dowsing has proved to be more accurate and capable of greater depth than modern search devices such as those used by treasure hunters and statutory undertakings. Some enthusiasts are applying the technique on pre-historic sites, the controversial ley lines and old trackways. The general reader, however, should treat the subject with light-hearted seriousness, considering dowsing to be a genuine form of ancient technology, but practiced for fun and entertainment. (Naylor 1980, 6)

Finally, in considering the effects related to the dowser, it is important to understand the influence of *coactors* (those individuals also engaged in dowsing at the same place and time)

and *evaluative others* (spectators not engaged in dowsing but watching the process). In my case, there were both—others dowsing the circle and additional visitors, some of whom were interested spectators. (I was even asked by some how the process of dowsing worked!) There are strong influences on performance as a result of the presence of coactors and evaluative others (Martens 1975; Schmidt 1988; Zajonc 1965), not the least of which is conformity. However, the problems of social facilitation and coaction are somewhat beyond the present work, although there is no denying their powerful effects. However, Naylor warns us to beware with respect to the attitude of evaluative others:

> . . . the novice is easily distracted by spectators, particularly if there are sceptics amongst them.

This is not the first report of what can be termed a "shyness" effect.

The Task

One of the more problematic aspects of dowsing is the chronic underspecification of the task. Since what is meant to happen and where and when it is meant to happen are often not specified before the event, virtually any outcome can be interpreted as supportive of the utility of dowsing. Are the rods supposed to converge, diverge, both point in the same direction, or even stay absolutely still as some critical threshold is approached or crossed? In my encounter, this was never made clear, and any movement of the rods was considered positive support. Of course, the required direction of movement of the rods *could* be specified; but this would present little difficulty to an experienced dowser since specific reactions can be elicited either by volitional movements (that is, intentional fraud) or subconscious movements (that, is unintentional action or self-delusion). I am persuaded that I encountered the latter. However, where more pecuniary interests are involved, I am sure others could give examples of the former.

Often, the object of dowsing is not specified, as was the case at the Rollrights. While sometimes dowsers will indicate what they are dowsing for—underground water, minerals, oil—what was being searched for at the Rollrights was not made clear. Dowsing the stone circle, then, was unlike dowsing for hidden sources such as underground water; for one, the latter is amenable to strict experimental control, since performance can be compared to what is actually the case (either there is water or there is not).

Indeed, James Randi (1982) has addressed the problem of underspecification by providing objective tests of dowsing capability. None of the dowsers he tested under such constraints came anywhere near the criterion for success. However, standing stones are immediately observable, so dowsers have an obvious opportunity to synchronize their response with the external conditions. Even under these circumstances, however, detailed kinematic and kinetic analysis of the dowser's movements could at least provide some indication as to whether the actions of the dowser are responsible for the gyrations of the rods. For example, it is recognized that, on approaching objects, people tend to slow down (Lee 1976). It is possible that changes associated with slowing down might be partially responsible for movement of the rods.

Interactions Between Influences

I have considered individually some effects that can be caused by environment, instrument, task, and performer. However, it is obvious that each of these work in conjunction. Even in discussing them, it is hard to dissociate interactive effects. It is a central tenet of ecological psychology that the actions of an individual cannot be understood independently of the context (environment) in which they occur (Gibson 1979; Hancock et al. 1995). The individual and the environment have a symbiotic relationship; the environment constrains action, but the individual acts to shape the environment. In this case, the performer is coupled to a highly unstable system that magnifies his or her subconscious, postural movements, bringing them into conscious perception. Rather than accept the effects of this magnification, some choose to attribute the perception to an external force. Vogt and Hyman (1959) observe:

> [W]e find that the theory of unconscious muscular action to account for the rod's movement, first put forth by Schott and Kirchner in the middle of the seventeenth century [Kirchner is credited with the first causal attribution of the rod's movement to muscular action (Barrett and Besterman 1926)] had to be worked out anew by Faraday and Chevreul in the middle of the nineteenth century to explain the movement of rods, pendulum and turning tables. (Vogt and Hyman 1959, 216; parenthesis added.)

There are, of course, similar considerations for interactions between all of the identified elements. As has been illustrated, a dowser's grasp, a property of the performer, cannot be considered independent of the nature and character of what is grasped (the instrument), in the present case the dowsing rods.

The principal error engaged in here is failing to recognize that the human body is a damping system that, although excellent, is not perfect and cannot correct for all environmental disturbances while engaged in walking, flying, driving, or other types of locomotion. Maintaining posture is a very active process. The individual makes constant adjustments and movements. Evolution has granted that such a continuous task is performed subconsciously, so that daily life is not spent in a never-ending effort to merely support oneself. Unfortunately, that battle was fought so long ago that we have no empathy for the freedom it provides. It is so much taken for granted that we are now willing, in the case of dowsing, to invoke mysterious "energies" rather than recognize this marvel of natural engineering.

A Comparable Circumstance

Some of the influences that persuade the naive observer in

favor of the efficacy of dowsing can be more clearly illustrated in other circumstances. I cite only one such example, another personal observation, although the are a plethora of others (for a more complete discussion see Vogt and Hyman 1959). Some years ago, I had an opportunity to observe a parade passing through the center of Kyoto, Japan. The parade consisted of a series of floats mounted upon large-wheeled, wooden wagons. One float in particular captured my attention. On top was seated a life-size figure of an old man holding a long, thin bamboo staff. The artist had designed the figure so well that as the wagon moved, the disturbances from the bumps in the roadway were transmitted via the staff to the arm and body. Was I looking at a genuine old man supporting himself while being bounced along a bumpy road, or was I looking at a puppet, whose movements were solely driven by the environmental disturbance? Many others also were puzzled by the artist's skill, and many spectators, especially children, were calling out or trying to get closer to see if the old man was real or not. In this case, it was a mannequin and not a real person, and all movement stopped when the wagon stopped. The problem was the uncertainty of causal direction. As we are so used to seeing people as the origin of movement, in this case the illusion worked. However, dowsing provides the contrasting circumstance, where we do *not* recognize the actor as cause and, consequently, some are misled to seek cause elsewhere.

Summary

This account is not an empirical evaluation of the efficacy of dowsing. It does not preclude the proposition that the movement of dowsing rods is a response to some, as yet, unknown force. Neither is it an exhaustive evaluation of the topic. Rather, it is an account of an experience and some conventional physical reasons why the effects observed may have occurred. The advantage to the conventional explanations is that they are open to direct experimental evaluation. Until such known physical causes are eliminated as possibilities, it is unwise to postulate additional mechanisms, although it should be remembered that Occam's razor is itself only a statement of belief. It is my current position that systematic kinematic and kinetic analyses of these activities would confirm the factors I have identified as the causes of the observed behavior. Fortunately, through science, such assertions can be validated or invalidated.

I suggest that dowsing is one example of a phenomenon I call "self as unrecognized cause." In this range of behaviors, the individual attributes causation to an external agency (e.g., earth energy) when the actual cause is his or her own, albeit unrecognized, actions. Among these actions are typically subconscious movements, such as respiration or correcting for postural stability. When such movements are magnified through an external instrument,[1] such as a dowsing rod, it can well appear that some environmental force is being encountered. Given the rhythmic nature and replicability of such bodily movements, it is not unexpected that the rods move with regularity as the individual repeats overt actions, such as walking across a "site" to be dowsed. Based on this observed regularity, the dowser is able to claim that the "force" remains consistent over repeated trials. Given that individuals also learn the relationship between such movements and outcome, performances such as dowsing stone circles also become feasible and replicable. Whether such performances are intentional fraud or unintentional self-delusion is difficult to determine (although a cynic might inquire whether money had changed hands). I hope in future to provide additional examples of "self as unrecognized cause" with regard to other putative paranormal phenomenon.

Acknowledgments

I thank Dr. Mark Scerbo for his comments on an earlier version of this paper. The observations of the editor were also most helpful, especially in bringing the work of Vogt and Hyman (1959 [1979]) to my attention. While the focus of this latter text is on "water witching," it provides an important general discourse on paranormal phenomena and their investigation. It deserves a careful perusal, and several of the ideas expressed in the present article are also discussed in detail in this work.

Note

1. Of course dowsing rods are not the only instruments through which such movement can be magnified. It is ironic that some of the first studies in motor control were triggered by the observation of the astronomer Bessel around 1820 (see Welford 1968), who was investigating the sources of inaccuracy of measurements of star transit times across multiple observers. Fortunately, he suspected individual differences in the ability to control fine motor skills, not some paranormal force.

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Anomalous Gold

"Ghost gold" eludes old-fashioned fire assaying but is snared by modern ghost-busting prospectors wielding doodle bugs.

K. R. BROWER

According to Dave Barry, "A common criticism of the Internet is that it is dominated by the crude, the uninformed, the immature, the smug, the untalented, the repetitious, the pathetic, the hostile, the deluded, the self-righteous, and the shrill. This criticism overlooks the fact that the Internet also offers—for the savvy individual who knows where to look—the tasteless and the borderline insane" (*Dave Barry in Cyberspace*, Crown Publishers, 1996). Someone who did know where to look on the Internet discovered a curious document called "Philosopher's Stone/Elixir of Life,"[1] which reveals that noble metals such as gold, platinum, iridium, and others can occur in amounts exceeding 1,000 ounces per ton of ore and yet somehow escape detection by the standard method of assaying. This news gives new hope to prospectors confronted with the depressing fact that current large-scale gold mining is mainly dependent on ores containing 0.1 ounces per ton or less.

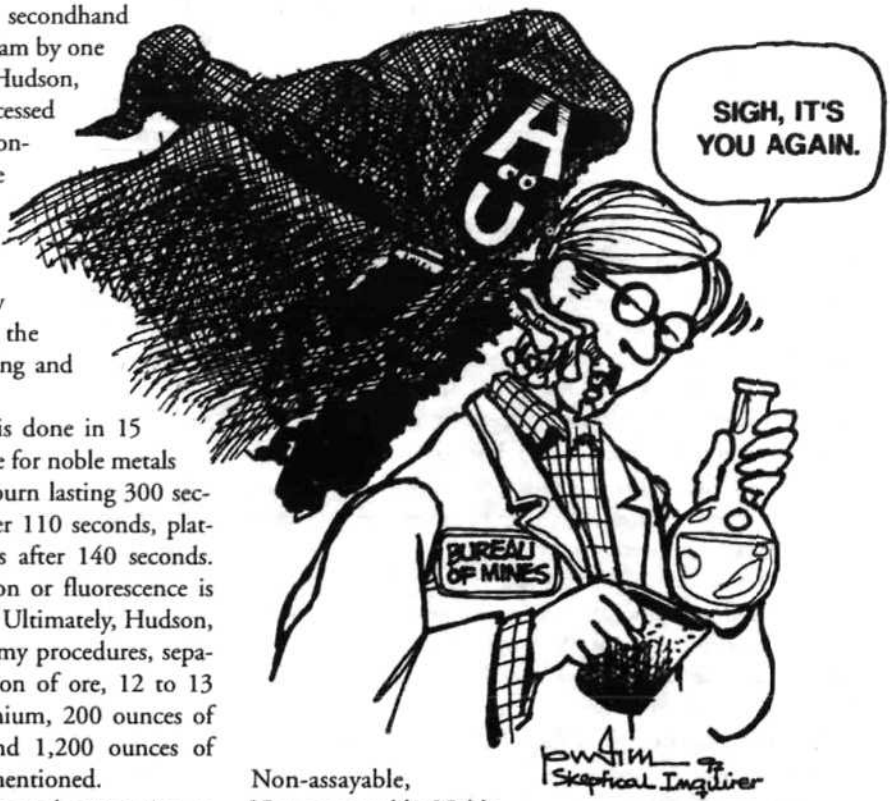
The Internet document contains a secondhand description of a $5 million research program by one David Hudson of Arizona. According to Hudson, mine tailings (the waste product of processed ore) that he has been processing by the conventional cyanide leach method have yielded a form of gold called "ghost gold." It is "non-assayable and non-identifiable" by standard fire assaying. Fortunately, however, he has found a new spectroscopic method, developed at the Soviet Academy of Sciences,[2] for detecting and quantifying noble metals.

Conventional spectroscopic analysis is done in 15 seconds, which doesn't allow enough time for noble metals to volatilize. The Soviet method uses a burn lasting 300 seconds with an atmosphere of argon. After 110 seconds, platinum is detected, and rhodium appears after 140 seconds. Analysis by X-ray (whether by diffraction or fluorescence is not clear) fails to show the noble metals. Ultimately, Hudson, assisted by a chemist using Soviet Academy procedures, separated 6 to 8 ounces of palladium per ton of ore, 12 to 13 ounces of platinum, 150 ounces of osmium, 200 ounces of ruthenium, 600 ounces of iridium, and 1,200 ounces of rhodium. Oddly enough, gold was not mentioned.

I have taken the liberty of simplifying and attempting to clarify the theoretical discussion in which Hudson explains that some noble metal compounds such as rhodium trichloride are actually oligomers containing as many as twelve atoms of rhodium connected by metal-metal bonds. After reduction, the metallic clusters can pass through a Millipore filter and escape detection. Gold atoms cannot be separated from one another; and, according to Hudson, "if you really think about it," this is due to its electronic structure of $5d^{10}\ 6s^{1}$. Nature, however, can produce monoatomic gold that comes up out of the earth. Hudson can produce monoatomic gold in another way, by thermal decomposition of AuH, which is called an "oride."[3] It loses 4/9 of its weight in the process. This is due to the high-temperature superconductivity of monoatomic gold, which interacts with the magnetic field of the earth.

It would be understandable for anyone not well acquainted with the history of gold prospecting to think that Hudson's ideas are uniquely bizarre, but, in fact, his main themes are like old familiar songs from a chorus of vanished prospectors.

The New Mexico Bureau of Mines and Mineral Resources is one of several government agencies in the United States dedicated to assisting mine owners, mining engineers, geologists, and prospectors in the economical recovery of minerals. Most of the background information for this article has been furnished by two of its staff members, Lynn Brandvold, Senior Chemist, and Robert Eveleth, Senior Mining Engineer. Over the years, the Bureau has received so many ore samples alleged to contain "non-assayable" gold—but which, when analyzed by the Bureau, gave only negative results—that a special information sheet has been prepared for distribution by the Bureau's publication office. Titled "The Myth of



Non-assayable, Non-recoverable Noble Metals," it is drawn from the writings of Mel Jennings, metallurgist. A more complete treatment of myths and frauds in gold analysis has been presented by W. G. Bacon, G. W. Hawthorn, and G. W. Poling (*CIM Bulletin*, Canadian Mineral Processors Division, November 1989). These authors say, "We write this paper with emphasis on fire assay techniques, which are a well-recognized standard, or preconcentration technique in the hope that the industry will learn to recognize and then ignore fraudulent assayers. At present the prospect of seeing them out of business, or better yet behind bars, seems improbable."

A unifying theme of anomalous-gold lore is that analysis by emission spectroscopy is more reliable than fire assaying. The basis for this belief is that a spectrum of ore that has not been concentrated shows such a multitude of lines that one or more of them will surely fall within the limits of resolution of the wavelength of gold's strongest emission line (280.219 nm). The MIT Wavelength Tables list seventy lines between 280.1 and 280.3 nm for metallic elements other than gold. Iron, which is almost always vastly more abundant than gold in an ore sample, has a line at 280.225 nm. Since prospecting for gold in a line spectrum is like looking for a needle in a

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haystack, and since straws look very much like needles, it is easy to find gold where it doesn't exist.

Faith is often reposed in another kind of spectroscopy called atomic absorption (AA). A sample is dissolved in a powerful oxidizing solvent, diluted, and sprayed into a very hot flame or inductively coupled plasma. The vaporized atoms of the element being sought are illuminated by a lamp emitting radiation from that same element. Absorption of the radiation is thus specific for the element being sought and nonspecific for all others. The results of AA are very reliable when they are properly interpreted, but when the absorbance is low, as it almost always is for unconcentrated gold ore, the signal may be swamped by background noise. A low absorbance does not reveal the presence of the sought element unless particular attention is paid to the background, but gold fever has a way of turning off the critical faculties of excited prospectors. Professional analysts know better than to misuse AA, but their clients may do it on their own.

A brief description of the fire assaying method may help you understand why a negative result should be the last word even though it often is not. A sample of ore is pulverized, parted, mixed with metallic lead and flux, and then heated in a crucible. Gold and other precious metals dissolve in the lead, and other minerals dissolve in the flux. The melt is poured in an iron mold where it separates into a slag (residue) and a lower layer of gold-containing lead. The lead is mechanically separated from the slag and placed in a porous ceramic container called a cupel. The lead is oxidized by heating it in air at 1,000°C, and the lead oxide is absorbed in the cupel. Gold and other precious metals are left behind in the form of a bead, which does not soak into the cupel because it has a high surface tension and does not wet the surface. The recovered bead is weighed and treated with nitric acid to remove whatever silver may be present. The initial weight and final weight give the proportion of gold and silver. If other precious metals are present, they are usually analyzed spectroscopically.

When the fire assay of an ore is negative, one wonders what has happened to the gold that the prospector was sure was present by the evidence of the naked eye and by the more "scientific" analysis by emission spectroscopy. It would be incorrect to think that most prospectors are stupid, uneducated, and irrational, but it is well known that gold fever can cause temporary derangement. A number of plausible-sounding theories have been advanced to explain why gold is sometimes "non-assayable." A common idea, which, by the way, is shared by David Hudson, is that gold consists of very fine particles that vaporize or somehow fail to dissolve in the lead collector. All experimental evidence to date indicates that fine gold, down to a size of one micrometer, is collected as efficiently and even more quickly than coarse gold. The temperature during a fire assay never comes within 1,000°C of the normal boiling point of gold, and the partial vapor pressure is utterly negligible.

Another common idea is that gold can form strange chemical compounds with nonmetals and that these compounds behave abnormally in a fire assay due to their inability to decompose to metallic gold. This idea flies in the face of chemical thermodynamics. The noble metals are so called because their oxides and other compounds with nonmetals easily revert to metals on gentle heating. Silver oxide, to mention one member of the lower nobility, loses oxygen under atmospheric pressure on heating to only 300°C and reverts to silver metal. Intermetallic compounds and alloys are stable, of course, but they pass readily into the lead collector during fire assaying.

There are, in addition, some completely mystical ideas about the nature of "non-assayable" gold. According to Hudson, "ghost gold" is one of the orbitally rearranged monoatomic elements (ORMEs), and its properties are completely different from ordinary gold. In line with the ontological argument for the existence of God, one could argue that the acronym would not exist if the orbitally rearranged monoatomic elements did not exist. It is fruitless to look for ORMEs in the writings of Agricola or Roger Bacon, but earlier studies found in more than five hundred books on alchemy have put Hudson on the right track. "It all goes back to a man [called] Hermes Trimesgritus [*sic*]," he says.

In addition to the overly optimistic and the mystics on the subject of "non-assayable" gold, there are mountebanks, charlatans, and swindlers. As an example, one expert, who shall go nameless, has invented a method for extracting precious metals by "radio frequency induction" and claims to have a Ph.D. from the Lincoln Laboratory of MIT. An inquiry addressed to the registrar of MIT disclosed that there is no record of any such degree. Sad to say, swindlers have sometimes seduced college professors who have authentic credentials into presenting spurious analytical results. The mining prospectus offered by a swindler usually has a number of giveaways such as persistent, egregious misspelling of technical terms and claims of secret, newly invented processes. Nevertheless many fools are parted from their money despite a general public perception that gold mining stocks are risky in the extreme. An amusing fictional example is the "Beefstake" mining stock in the W. C. Fields film *The Bank Dick*. Happily, a plot twist reverses the fortunes of swindler and victim.

Now we come to the bottom line. It is irresistibly tempting to borrow it from a book by Woodward and Hoffmann on chemical reactions governed by the conservation of orbital symmetry. The book contains a chapter devoted to exceptions, and it delivers its message in just three opening words, "There are none!" To the question of how many legitimate gold mining companies have ever made a profit by processing reserves of "non-assayable" ore, we get the same answer: "There are none!"

Notes

1. The document was available on the Web in October 1996 at http://www.teleport.com/~iank/etherium.shtml. It has since been removed and the site (http://www.teleport.com/~iank) was no longer accessible as of this writing.

2. I am aware of no organization called the Soviet Academy of Sciences. He may mean the Academy of Sciences of the USSR.

3. "Oride" is probably a misspelling of "auride," which is a legitimate (formally correct) but imaginary representation of AuH (hydrogen auride) patterned after the real compound HAs (hydrogen arsenide), for example. You will not find AuH listed in chemical handbooks. □

Open Minds and the Argument from Ignorance

Arguments from ignorance fallaciously infer that since a hypothesis has not been disproved, it is reasonable to believe that hypothesis or regard it with an open mind.

JONATHAN E. ADLER

At the start of the jury's deliberations in the 1957 film *Twelve Angry Men,* a straw poll yields eleven "guilty" votes and one "not guilty" vote. The lone juror, played by Henry Fonda, concerned that conviction on a murder charge not be hasty, says defensively, "Supposing we're wrong . . . ," to which another juror responds indignantly, "Supposing we're wrong? Suppose this building should fall down on my head! You can suppose anything."

My sympathies are with the second juror. In fact, throughout the first third of the movie Fonda's character repeatedly appeals to mere suppositions and possibilities, typically without the least attempt, as he often admits, to back them up as at all probable.

The character's reasoning conforms to the *argument from ignorance,* standardly classified as a fallacy. Admittedly, Fonda's character is the hero. He eventually convinces his co-jurors, and rightly so we are led to think, that their initial quick and prejudicial judgment of guilt was wrong. But the

result is only a minor embarrassment. If good reasoning can be put to ill use, bad reasoning can be put to good. The argument from ignorance is one of the most prevalent in defending beliefs that starkly conflict with scientific findings.

As many readers will know, in 1992 a conference on alien abduction was held at MIT. The conference was covered by a well-regarded journalist, C. D. B. Bryan, who avows nonbelief in alien abduction, and the resulting work was published by one of the best publishing houses (Bryan 1995). After the Abduction Study Conference, Bryan conducted extensive interviews. At the end of a chapter reporting his interviews with two of the most credible "experiencers," he reasons:

There is a difference between admitting that one may be wrong, which is to acknowledge one's fallibility, and treating that possibility of error as a genuine reason to doubt.

> During the days immediately following the conference, I am struck by how my perception of the abduction phenomenon has changed: I no longer think it a joke. This is not to say I now believe UFOs and alien abduction are *real*—"real" in the sense of a reality subject to the physical laws of the universe as we know them—but rather that I feel something very mysterious is going on. And based as much on what has been presented at the conference as on the intelligence, dedication, and sanity of the majority of the presenters, I cannot reject out-of-hand the *possibility* that what is taking place isn't exactly what the abductees are saying is happening to them. And if that is so, the fact that no one has been able to pick up a tailpipe from a UFO does not mean UFOs do not exist. It means only that UFOs might not have tailpipes. As Boston University astronomer Michael Papagiannis insisted, "The absence of evidence is not evidence of absence." (Bryan 1995, 230)

Bryan explicitly denies concluding that alien UFOs are real. In effect, then, Bryan is denying that his reasoning even constitutes argument. Moreover, if there is a conclusion, it is only for the "possibility" that the abductees' stories are correct, and that appears so weak a judgment that argument hardly seems called for.

Elsewhere, Bryan asks an investigator "why he thinks there is such resistance within the psychiatric and scientific community to even the possibility that the source of the trauma is what the abductees are saying" (Bryan 1995, 268). By contrast to those communities, Bryan characterizes his position as one of open-mindedness. He ends his book:

> Still, until someone comes forward with proof that such beings don't exist, I intend to continue keeping an eye out for their "bobbers" [a metaphor for any solid indicator of alien presence]—and, yes, an open mind. (Bryan 1995, 448–449)

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So Bryan's conclusion, if such it be, is extremely weak. He is not arguing that the alien abduction stories should be believed or accepted or even thought probable.

Nevertheless, Bryan is offering an argument—an argument from ignorance—broadly of the following kind:

1: No one has disproved *p* (where *p* stands for any hypothesis, e.g., *psychics are able to communicate with the dead*; some alien abduction accounts are true).
2: So it is possible that *p* is true.
3: If it is possible that *p* is true, then we should keep our minds open to the investigation of *p*'s truth.

Conclusion: We should keep our minds open to the investigation of *p*'s truth.

Premises 1 and 3 are implicitly assumed by Bryan and are typical of arguments from ignorance. Premise 2 Bryan explicitly states. The conclusion is implied by the premises, as well as stated by Bryan elsewhere. Bryan appeals as well to the credibility of the reports, which does not enter the structure I present, but I'll return to it later.

Others draw much bolder conclusions. Specifically, on similar grounds, it is sometimes inferred that it is reasonable to believe *p*. However, there will be many cases in which if no one has disproved *p*, then no one has disproved its contradictory, not-*p* (e.g., no alien abduction accounts are true). But then the argument would license the inconsistent belief that both *p* and not-*p* are true.

The crucial term in the reasoning is *possible*. My main criticism is this: The sense in which premise 2 is true, or can at least be granted, is far too weak for the conclusion.

In one usage, to hold that it is "possible" that the reports of alien abductions are correct is to hold that the reports are compatible with our evidence (i.e., "not impossible"). This is very weak. In this usage, as the second juror appreciates, it is possible that if I jump off the World Trade Center, I will be saved by a freak wind that lands me safely on the ground. In another usage, to hold that it is "possible" that the reports of alien abductions are correct is to hold that their truth is a *serious* possibility—that we shouldn't disbelieve them and their study is worthwhile.

The plausibility of the reasoning trades on this ambiguity. When we are inclined to think it unreasonable to reject the possibility that alien abduction reports are correct, we are treating it as *bare* possibility. After all, we think, it isn't impossible. Consistent with our evidence, the reports could be true, even if vastly improbable.

But in order to claim that we should keep an open mind, we need the stronger notion of *serious* possibility. For only then do we have reason not to disbelieve alien abduction reports and to take the reports as even prima facie credible. Though my being saved by a freak wind after jumping from the World Trade Center is possible in the weak sense, it is not at all credible. We reject it out of hand.

The conclusion of open-mindedness also is meant to have the strong implication that we should not treat the absence of evidence as evidence of absence. In fact, the phrase "absence of evidence" is a misnomer. For absent evidence is real evidence. It is the evidence of a failure to detect expected effects of a hypothesis, and so it is evidence against the hypothesis.

In Conan Doyle's Sherlock Holmes story "Silver Blaze," the absence of evidence of the dog's barking is the clue that someone who knows the dog well, like its trainer or master, is the culprit. Since the expected effects (the dog's barking) of the hypothesis (that the criminal is a stranger) are not detected, there is genuine undermining evidence against it.

Still, the undermining import of the absence of evidence can be overriden. If there is evidence (not the mere possibility) of the dog's being drugged, that would override the inference. Defenders of the alien abduction reports do seem to offer overriding evidence or reasons of two kinds. First, they rely on the reports of the alleged abductees; second, they offer conjectures for why the expected effects are undetected.

The first kind of reason is indicative that we never find a pure argument from ignorance. To so label an argument is not only pejorative, but tendentious. But I stand by it. The label involves a simplification of a complex presentation, but it will pay off in illuminating an important strand of reasoning.

As is typical, there are always some phenomena, some disturbing reports, some mysteries that cry out for explanation. But if we are to treat these as credible evidence, they must survive confrontation with other available, relevant evidence. Otherwise, to rely on the puzzling observations and reports alone may be unrepresentative or biased, and so misleading.

Very briefly, standing against the reports of alleged alien abductees is the vast evidence of the established physical laws that would have to be violated or strained. The criterion goes back to David Hume (Hume 1977 [1748]). Aside from the most obvious failure of extensive scientific studies to detect any intelligent organisms outside Earth, regular visits of aliens assume possibilities for space travel at speeds close to, if not exceeding, the speed of light. We also have credible alternative (psychological) explanations for the reports.

In fact, in the passage cited earlier (Bryan 1995, 230), Bryan makes no real attempt to balance the credibility of the reports against the massive weight of standard evidence and alternative explanations. In the remainder of his book, he does make attempts to do so, though of a very scattershot sort. The main suggestion, instead, is that we be moved by the credibility of the "experiencers" alone.

However, the second tack is to offer explanations that lend credence to the abductee accounts. Following the lead of the investigators, Bryan offers a simple speculation:

> . . . just because UFOs and their occupants defy our laws of physics does not mean there are not further laws of physics we have not as yet discovered or do not as yet comprehend. . . . (Bryan 1995, 422)

Additionally, he attempts to explain away the absence of evidence by positing vast, unprecedented conspiracies to suppress reports of sightings on the part of otherwise highly competitive and diverse reporters, government officials, and scientists.

These sweeping assumptions are themselves at one with the argument from ignorance. When we grant ourselves blank-check assumptions, we move away from serious possibility to bare possibility. For the more we assume against what is already believed or accepted or well confirmed, the less plausible is our hypothesis. The plausibility that aliens have visited Earth, however low, is still much higher than that they do so regularly, virtually undetected, by means that involve the violation of our laws of nature and a conspiracy to silence a story of immense interest.

We should not set these assumptions aside as a heuristic whose only purpose is to facilitate a fair hearing for the abductee reports. They are essential to whether an open mind on the hypothesis is deserved. For, recall, these assumptions are pivotal for overriding the powerful evidence for rejecting alien abduction stories as false, including evidence of absence.

The request to keep an open mind appears mild, but it is a wolf in sheep's clothing. "Open-minded" trades upon the same ambiguity we found in the use of "possible."

The open mind being called for is an openness to any hypothesis that has the bare possibility of truth. Why shouldn't we be so open? Why do we need the notion of serious possibility in the first place? Wouldn't our search for the truth only be improved by not restricting in advance what hypotheses we consider?

The request to keep an open mind appears mild, but it is a wolf in sheep's clothing.

The answer is that our time and resources are limited. There are vastly more hypotheses possible (consistent with our evidence) than can be studied. Closed-mindedness, in the sense of ruling out vast numbers of hypotheses prior to examination, is a precondition of any serious empirical inquiry.

Yet, no hypothesis is forever banned. We may subsequently reconsider, as has often occurred in science, a hypothesis once thought ridiculous. But when we do, there will be a preliminary stage in which we find it minimally plausible.

Of course, we each put aside time for hobbies and idle pursuits. In these terms, one may keep up with the literature on UFOs, the paranormal, and related subjects, and even investigate them on one's own. The interest and pursuit does not require any positive attitude, not even an open mind, in the strong sense that the argument from ignorance requires. (Indeed, it is just because there are a few devoted "fringe-watchers" that the rest of us can, in all intellectual honesty, both ignore new fringe claims and still be sure that our dismissal is warranted. For the lack of reports by reputable researchers favoring these claims is continuing, profound evidence against them. Once again the absence of evidence *for* is

powerful evidence *against.*)

How is my objection to the relevance of bare possibility to be squared with the banality that the findings of science are fallible? Actually, the fallibility of science is greatly exaggerated. But without going out on that limb (and tangent), let me focus on a premise directly relevant to my criticism. There is a difference between admitting that one may be wrong, which is to acknowledge one's fallibility, and treating that possibility of error as a genuine reason to doubt. If one does treat fallibility as a genuine reason, one is arguing from ignorance. Our ignorance that we are certainly correct is taken as a reason to withdraw from belief.

What truly marks an open-minded person is the willingness to follow where evidence leads.

Obviously, no one normally so reasons. I could possibly be mistaken that my sister lives in Long Island. But it is not the slightest reason to believe that she doesn't live there.

An exception is when one is engaged in discussion of radical skepticism, the venerable philosophical view that no one knows or has any reason to believe anything. My final three claims about arguing from ignorance are these: First, arguing from ignorance is a disguised radical skepticism; second, when one so reasons, one falsely represents what one believes; and third, arguing from ignorance appears plausible, aside from the ambiguous uses of "possible" and "open mind," because we fail to appreciate the intimate connection between belief, truth, and evidence. These are large claims and space is limited, so argument will be abbreviated and somewhat dogmatic.

First, it is a disguised radical skepticism. We appear to be talking of a specific hypothesis, such as that the alien abduction tales should not be dismissed. However, the underlying reasoning casts doubts far wider. We do not appreciate that the flip side of this positive conclusion to keep an open mind is a severe negative result. If the mere possibility that a hypothesis is correct is a reason not to dismiss it, then, by parity of reasoning, the mere possibility of error is a reason to doubt. The latter is, effectively, radical skepticism. For anything we believe, we have reason to doubt it simply by virtue of our fallibility.

Second, given these radical implications, arguments from ignorance are in conflict with what people truly believe. But these implications are not always apparent. Consequently, it is not always evident that the conclusions of an argument from ignorance conflict with what everyone, the arguer included, generally believes. No one truly doubts that they are sitting in front of their fireplace simply because it is possible that they may be dreaming it. (Descartes introduced this famous doubt in the appropriate context of his radical inquiry. But even he immediately worried. These doubts, genuine though he takes them to be at this stage of his inquiry, remain helpless to prevent his continued belief in all that is evident to him.)

Third, arguments from ignorance treat beliefs as attitudes that we can adjust to human interests, hopes, and aspirations. If a hypothesis is not proven false, then it is permissible to believe it. But the result cannot be a belief. For a belief is an attitude toward a hypothesis as a correct representation. In a slogan: Beliefs aim at truth. (For a good discussion see Williams 1973.) It is because our beliefs are our attitudes toward truth that they guide action. If we want to quickly get to a destination by train, we rely on our memories (beliefs) as to the train schedules and station locations. Our action succeeds if, and usually only if, the guiding beliefs are correct.

Our beliefs are likely to be correct if they arise from reliable sources. For hypotheses, the main source is evidence. What counts as evidence for a hypothesis are those observed phenomena whose existence depends upon the truth of the hypothesis and so attest to it.

Once I recognize the evidence for a hypothesis as adequate to establish it, I believe it; and conversely, if the evidence refutes the belief. When neither occurs, I suspend judgment.

A medieval challenge is to try to believe the proposition "The number of stars is even" (Burnyeat 1983). It is a challenge we must fail, though it is surely possible that the statement is true. We can only suspend judgment, exactly in accord with the evidence being manifestly indecisive. No choice or option to believe is available, self-deception aside.

What truly marks an open-minded person is the willingness to follow where evidence leads. The open-minded person is willing to defer to impartial investigations rather than to his or her own predilections. It is here that the nineteenth-century American pragmatist Charles Peirce finds the scientific method an advance over other methods for determining (fixing) belief, such as appeal to authority, tenacity, or *a priori* reasoning. Scientific method is attunement to the world, not to ourselves:

> To satisfy our doubts, therefore, it is necessary that a method should be found by which our beliefs may be determined by nothing human, but by some external permanency. . . . (Peirce 1957, 24)

If the evidence against alien abductions and many other supernatural and paranormal speculations is overwhelming, then an open-minded person must reject them.

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200% Probability and Beyond:

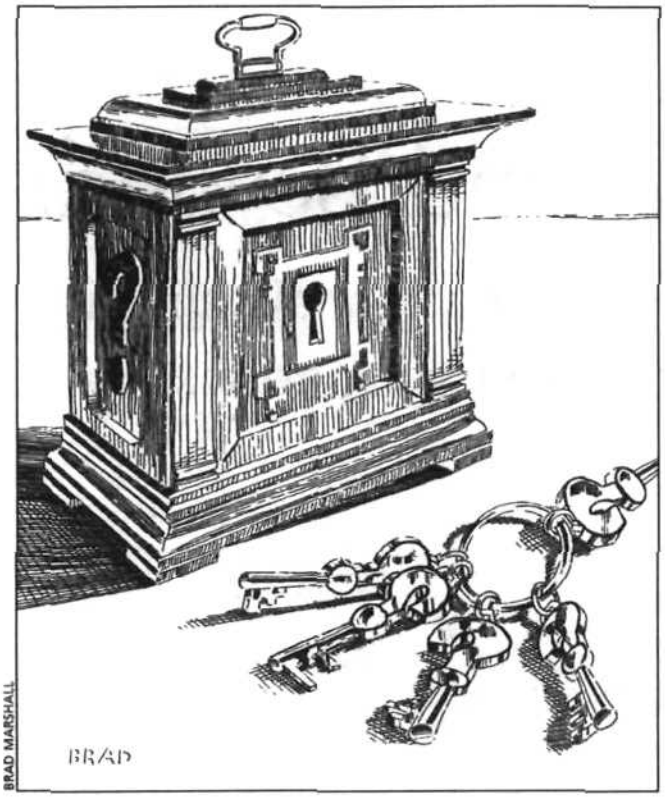
The Compelling Nature of Extraordinary Claims in the Absence of Alternative Explanations

The likelihood that people will accept any given proposed explanation of an unusual event—even one almost certainly wrong—is directly related to how few alternative explanations are accessible.

JOHN McDONALD

Imagine the following scenario. You come home from work, turn on the TV, and tune in to a newsmagazine program in which a reporter records her experiences at a weekend seminar in firewalking. Like you, the reporter is skeptical of the claim that, by exercising the power of mind-over-matter, individuals can transcend the physical properties of a bed of hot coals. You wonder if she'll uncover some clever trick that explains the whole thing. Perhaps she'll even manage to expose the seminar administrators as flim-flam artists.

Cameras follow the reporter as she goes from one class to the next. The firewalking seminar consists of lectures and exercise groups in which the philosophy of mind-over-matter is expounded, and various breathing, visualization, and meditative techniques are taught. The art of firewalking appears to require nothing more than 1) putting yourself in a relaxed meditative state, 2) staring upward while visualiz-



BRAD MARSHALL

ing yourself stepping onto a thick mat of cool moss, and 3) walking briskly and unhesitatingly across the "moss."

At first, the reporter jokes about all the New Age jargon in the lectures: "Apparently my chakras needed a good boost of prana to put them back into alignment with my chi." On the final evening of the seminar, however, as the group prepares to walk across a genuine bed of hot coals, the reporter gets a bit more serious. She is surprised by the bright red glow of the coals and the intensity of the heat emanating from them. An accurate, scientific pyrometer, brought to the seminar by the reporter herself, is placed on the coals and the indicator rises to 1,295°F!

The instructors go first, walking steadfastly over the coals without incident. Each successful trek elicits cheers of awe and approval from the pupils. Following the lead of their mentors, the bravest novices start across the coals. Eventually, even the most reluctant line up for the walk. The applause continues as, time after time, human flesh seems to transcend physical reality. A bit nervous at first, the reporter steps up and shows the bottom of her feet to the camera in order to appease the skeptics. "I assure you there is no protective chemical on my feet or on the ground around the pit," she says. "My feet are bone-dry and ready for the fiery plunge." She then gets very serious, concentrates on her breathing, stares upward, and promptly walks across the coals. The cheers are wildly enthusiastic. "Well, I was skeptical at first," she says, "but this experience has made a believer of me. I've just walked across ten feet of scorching coals and my feet feel fine. I, for one, will never underestimate the power of the human mind again."

If, within the context of the preceding scenario, the mind-over-matter explanation seems at least mildly compelling to you, just imagine how compelling it might seem if you had actually attended the seminar and walked across the coals yourself. After walking across coals so hot they could be felt several feet from the pit, the mind-over-matter explanation might well start to sound like a reasonable possibility. For many who attend firewalking seminars, this explanation is so forceful that it is enthusiastically embraced as an obvious reality (Leikind and McCarthy 1985). This is despite the fact that the very idea that brain activity could alter the physical properties of burning carbon compounds or the reactivity of skin cells to extreme heat contradicts volumes of well-established scientific data. Why is it that even wildly implausible claims like this one are so psychologically compelling?

The Hypothesis

One factor that might account for some of the persuasiveness of arguments for extraordinary phenomena is the inaccessibility of alternative explanations. If it is not mind-over-matter, just how is firewalking accomplished? If she is not psychic, then how could she have known about my mother's illness? If it is not a miracle, then how could a solid marble statue weep tears of blood in front of hundreds of witnesses? The question "Can you think of anything else?" is commonly used as an argument for the validity of a claim. If you can't think of any other explanation, then, *ipso facto*, I must be right.

The idea that a lack of alternative explanations might play an important role in the acceptance of certain claims is supported by the psychological research literature. Confidence in any given explanation has been shown to be a function of the availability of alternative explanations (e.g., Fischhoff, Slovic, and Lichtenstein 1978; Gettys, Mehle, and Fisher 1986; Gettys, Pliske, Manning, and Casey 1987; McDonald 1990; McDonald and Stenger 1993; Sloman 1994). There is a problem with relying exclusively on a heuristic that tells us to rate the probability of an explanation high when there are few alternative explanations available. This simple rule does not take other important factors into account, such as the limits of our personal knowledge in certain domains and the limits of our cognitive capacities to access or construct reasonable alternatives on the spot.

In a now classic study, Fischhoff et al. (1978) presented subjects with organized lists of possible causes of a car's failure to start. The researchers measured the effect that omitting causes from the list had on the perceived probability of the presented causes (the *specified hypotheses*). Even though subjects were always provided with a *catchall hypothesis* labeled "All other problems [explanations]," they tended to respond as if most of the causes omitted from the list simply didn't exist. If several categories of possible causes were left off of the list, the remaining categories were perceived as being significantly more probable than when the list was complete.

Note the inconsistency of subjects' behavior with a formal

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logical assessment of the experimental problem. Logically, as additional reasons for a car's not starting are added to the list, the catchall hypothesis should decrease in probability while each specified hypothesis should remain constant in strength. Subjects in Fischhoff et al.'s experiment, however, reduced their estimates of the probability of the specified hypotheses as the list increased in size and did not reduce their estimates of the probability of the catchall hypothesis as much as they normatively should have.

Keep in mind that almost everyone has some prior knowledge of the reasons why a car might fail to start, and most people probably have had personal experiences involving this common event. Someone who recently had his or her car battery stolen would probably not be blind to this particular explanation for why the car wouldn't start were it left off of the presented list. Thus, in the car problem, and other experimental tasks involving familiar events, subjects' probability estimation data are not an exact function of the number of explanations provided, and there is only so much information that can be omitted before the catchall hypothesis is perceived as being highly likely to contain the truth.

It was this observation that led me to wonder what the results might be if, instead of targeting familiar, everyday events, I designed an experiment that targeted novel, surprising events that could not be explained easily via personal knowledge subjects brought to the task. My prediction was that, under these conditions, the number of hypotheses presented would account for virtually *all* of the variability in the perceived strength of individual hypotheses. Specifically, I predicted that *the average probability rating assigned to each specified hypothesis would approximate the portion of the presented hypothesis set that a single hypothesis comprised.* When a single specified hypothesis comprised one-third of the total number of presented hypotheses (i.e., the case in which two specified hypotheses and the catchall hypothesis are presented), it should be perceived, on average, as 33.3 percent probable. When a single specified hypothesis comprised one-fourth of the total number of presented explanations, it should be perceived as 25 percent probable, and so on.

In addition to allowing for exacting predictions of perceived probability estimates, the use of complex, surprising target events also attracted me because these are the types of events typically targeted by proponents of paranormal claims. It is precisely because most people lack a good background in physics and the thermal capacities of physical substances that the act of firewalking appears baffling. It is precisely because most people lack adequate knowledge of proper experimental controls and scientific principles that the positive findings of a remote-viewing experiment can seem awesome and mysterious. Likewise, the experimental event descriptions that I chose to employ were designed to leave most subjects in a state of puzzlement. The targeted events did not suggest anything paranormal, but they did involve unfamiliar, enigmatic phenomena. The ability to construct sound, naturalistic explanations of these events required knowledge of physical laws, scientific facts, or statistical and methodological principles that most people probably would not possess or be able to readily access.

The Experiment

To test my predictions, I presented each subject with a narrative description of three novel, hypothetical events. Depending on the event to which they were randomly assigned, subjects were given from two to five mutually exclusive explanations for each event. The given explanation set always included the catchall hypothesis. I provide here an example of one of the event descriptions, along with the complete set of four specified hypotheses and the catchall hypothesis.

The Event: A Plant Grows Colorful Berries

A new species of plant has been discovered growing in the nutrient-poor, sandy soil of a remote island. The plant produces clusters of berries on its branches. Although one species of bird spends a good portion of the day feeding on the berries, no other animal on the island eats the berries.

The seeds found in the berries are not spread by the birds' droppings; they are completely digested by the birds. Despite the fact that the plant's seeds are so vulnerable to the birds, the plant grows bright red berries that are easily detectable. Very few berries escape being eaten. A group of biologists studying the new plant were intrigued by this. Why had this plant evolved brightly colored berries when bright colors seemed such an obvious disadvantage to its survival?

Explanation A

In order to grow in nutrient-poor, sandy soil, a plant needs a good fertilizer, and bird droppings make one of the best. What the plant may lose in having most of its berries eaten, it more than gains by having the birds spend a good portion of the day depositing their droppings around the plant. It pays for the plant to advertise its berries.

Explanation B

Isolated island ecologies are often disturbed by the introduction of new species that might accidentally fly by or drift over to an island. The birds are probably new arrivals to the island, and prior to their arrival the plant had no need to protect its seeds. Now that the birds have arrived, the berries' bright color is an obvious disadvantage to the plant.

Explanation C

Just because the birds do not disperse seeds in their droppings does not mean that they don't help disperse seeds by other means. Pieces of sticky fruit and seeds must occasionally stick to a bird's beak or feathers and get carried away to new areas of the island where they might take root. The plant thus benefits from advertising its berries.

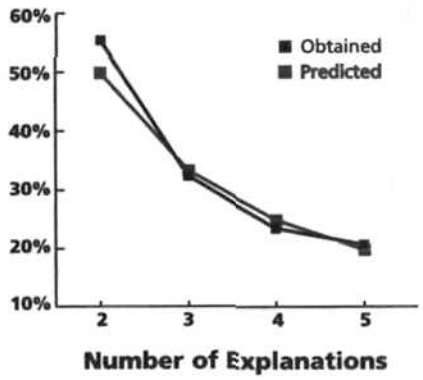

FIGURE 1. Mean perceived probability of specified hypotheses as a function of the total number of hypotheses presented.

Explanation D

An important clue to understanding why the berries are bright red is the fact that no other animal on the island eats the berries. Like many brightly colored things in nature, the berries are probably poisonous. The birds must be the only species to have developed a resistance to the poison. The bright color of the berries is a warning that protects the plant from most hungry organisms. It is only in the case of the birds that the strategy doesn't work.

Explanation E (Catchall Hypothesis)

There is *some other explanation* for this phenomenon.

It was emphasized to subjects that, although an event can have more than one cause, it can have only one *main* or most important cause. Because the task was to estimate the probability that each given explanation was the main cause of the event in question, and because each set of explanations always included a catchall hypothesis, probability estimates had to add up to 100 percent. Subjects were given a practice problem to ensure that they understood this concept and that their estimates would not violate this *summation axiom*.

The results strongly supported all predictions. As depicted in Figure 1, the mean probability estimates assigned to specified explanations by the two-explanation group through the five-explanation group were 55.42 percent; 32.36 percent; 23.47 percent; and 20.69 percent, respectively. The correspondence between obtained and predicted scores was striking.

Because subjects were instructed as to why their summed estimates, including the catchall hypothesis, always had to total 100 percent, it was not possible to assess individual subjects' probability estimates with respect to violations of the summation axiom. However, it was possible, via extrapolation, to determine whether the average probability scores assigned to individual specified explanations exceeded what is logically possible for individual members of the set of four specified explanations constructed for each event. The procedure simply entails multiplying each group's average probability estimate for individual specified explanations by the total number of constructed explanations (i.e., 4). This produces a highly conservative measure because it treats each experimenter-generated set of specified explanations as an exhaustive set. In fact, many more plausible-sounding explanations could have been constructed for each event. Thus, any values exceeding 100 percent could reasonably be regarded as evidence for overconfidence in the probability of specified hypotheses.

The extrapolated means for the two-explanation through the five-explanation groups were 222 percent, 129 percent, 94 percent, and 83 percent, respectively. As predicted, the scores calculated for the smaller specified-hypothesis sets indicate overconfidence. The score for the three-explanation group exceeded 100 percent, and the score for the two-explanation group actually exceeded 200 percent probability!

Apparently, when it is difficult for subjects to retrieve explanations from memory or to construct them from available information, the number of textually presented explanations is a good predictor of the perceived probability of individual explanations. Obtained results very closely approximated the results that would be produced if subjects were basing their probability estimates exclusively on the number of alternative hypotheses listed. When the specified explanation set was small, this led to gross overconfidence.

This is not to imply that the accessibility of alternatives is the only factor that plays a significant role in the acceptance of presented explanations. (To suggest so might make one guilty of the same biases revealed by the present research.) Gilovich and Savitsky (1996), for example, point out the role of the *representativeness heuristic* (the "judgmental shortcut" based on the belief that effects should resemble their causes) in accepting explanations. People tend to estimate the probability of an explanation based on the degree to which the cause "looks like" the effect. The claim that keeping an image of cool moss in your mind will keep your feet cool while firewalking probably gets some of its intuitive appeal from similarities between the image and the outcome.

In addition, a number of researchers have pointed out that people often express extreme confidence in explanations that are psychologically desirable (e.g., Kruglanski 1989; Kunda 1990; Pyszczynski and Greenberg 1987). This is important for understanding the acceptance of paranormal claims because many paranormal belief systems involve comforting notions of immortality and reunion with departed loved ones. Even a belief in flying saucers might serve to make your world a more exciting place, give you something to talk about, or make you feel like you are a valued member of a heroic subculture.

The point is that numerous factors besides the accessibility of alternative explanations probably play a significant role in the acceptance of claims. Nevertheless, the data suggest that the lack of accessible alternatives might well play an important role, particularly with respect to claims about events that cannot be readily explained via commonplace knowledge. How could a six-year-old under hypnosis begin speaking in Medieval English unless he had a previous life during that period of history? How could a psychic detective so readily indicate the exact location of a hidden body that the entire San Francisco police force could not find in a ten-month search,

'What Else Could It Be But Aliens?'

I once found myself involved in a largely one-way conversation at a bar with a young woman I had just met. Although the encounter occurred too long ago for me to guarantee verbatim quotations, I can still recall the gist of the discussion.

The woman was intent on telling me about the recent outbreak of cattle mutilations and their clear link to extraterrestrial invaders. Cattle were turning up dead all over the place with their eyes and testicles carefully, surgically removed. Strange lights were often seen in the sky the night before the bodies were discovered, and no human culprits were ever found. "What else could it be but aliens?" she asked, sensing my reluctance to accept her explanation.

"I don't know," I said and then added rather lamely, "Maybe some cult group is using the parts in their rituals."

"Some cult group!" she responded, a bit angry by this time. "What about the lights in the sky, and the surgical precision, and the large geographic distances between each case? How could it be a cult group?"

"I don't really think its *likely* to be a cult group," I explained. "I just threw that out as one possible alternative. The fact is, I just don't know what the real facts of the story are, and I don't know what the correct explanation is. But I think its pretty unlikely that we're dealing with alien invaders with testicle fetishes."

"You can't think of any other explanation, yet you reject mine. If that's not the ultimate in closed-mindedness, I don't know what is."

Things were really starting to heat up. "I'm not being closed-minded—you are," I said. "I'm simply saying that I don't know what caused the supposed cattle mutilations. You, on the other hand, are saying that you know exactly what caused them, and that all other possible explanations must be false. That's being closed-minded."

"But you don't even have any other possible explanations. That's why you're the one being so closed-minded. (You might be picturing two kids in a schoolyard by now. "You're the dummy." "No, you're the dummy.") If there's no other possible explanation but mine, then it couldn't possibly be anything else."

Her last comment made me see the futility of carrying the debate any further. Needless to say, this chance encounter did not develop into a long-term relationship.

—*J. M.*

unless she has true psychic powers? In the face of resistance to such extraordinary explanations, the claimant can always choose to settle the matter with a carefully intoned, "Well, can you think of any other explanation?"

Implications

In addition to having special implications for extraordinary claims, the *can-you-think-of-anything-else heuristic* also has clear ramifications for the acceptance of more ordinary claims that focus on complex events for which the average person cannot generate alternative explanations. In fact, many of the medical, psychological, sociological, historical, and hard-science claims that appear in the mass media are presented under conditions very similar to those employed in my novel-event experiment. Enigmatic events are presented in abbreviated form and then neatly explained via some logically consistent "scientific" theory. Thus, when a book-hawking, pop-psychologist explains to a reporter how unfocused, free-floating anxiety is caused by early childhood experiences in which our parents taught us to be afraid of our natural organismic feelings, their explanation sounds good. It makes sense of an otherwise strange emotional state in which one feels uneasy in the absence of any identifiable causal agent.

One difference between the conditions of my research and typical real-world conditions is that my experiment always included the catchall hypothesis as a salient alternative. In contrast, real-world claimants often downplay the suggestion that there might be a whole set of reasonable alternative hypotheses. Under real-world conditions similar to those of the novel-event experiment, but without the catchall hypothesis, we should not be surprised to see a mean probability estimate for a single-explanation group that greatly exceeded the 55 percent mean estimate observed for the two-explanation group. In fact, in a more abstract categorical hypothesis-testing task that did not list a catchall hypothesis (McDonald 1995), more than 80 percent of the subjects generated probability estimates of 100 percent for single specified hypotheses. What makes these estimates exceptionally striking is that in all cases there was an identifiable correct hypothesis, and the single specified hypothesis under investigation was never the correct one. More than 80 percent of subjects judged a specified hypothesis to be absolutely certain under conditions in which it was certainly wrong!

Research such as this carries a straightforward message for a claimant whose sole goal is to convince an audience of his or her proposed explanation of some phenomenon. Begin by presenting a description of an event that has no obvious, readily accessible explanation. Then, present your detailed, carefully thought-out explanation of the event, making sure that it is consistent with the "facts" as you choose to present them. This simple tactic will frequently be sufficient to convince a good portion of your audience that you are probably right.

Even when obvious alternatives to your proposed explanation exist, the situation is not insurmountable. Suppose you

200% PROBABILITY
continued on page 64

Psychic Exploitation

While some "psychics" represent a harmless form of entertainment or act as benign counselors, others knowingly hurt and con vulnerable clients. The authors recently investigated some of these individuals operating in London.

RICHARD WISEMAN and EMMA GREENING

Psychic Surgery

Just over a year ago, I, the first author, was invited to a function room of a London public library to observe a demonstration of psychic surgery. I did not anticipate that the performance would contain anything new or exciting—perhaps the surgeon would appear to make some cuts on the patient's stomach, pretend to remove some diseased tissue, and then cause the wound to "miraculously" recover. The demonstration was, in reality, far more disturbing.

I arrived about ten minutes before the start of the demonstration, and the function room was already crowded. The surgeon's helpers asked individuals who wished to be treated to make themselves known. About thirty people raised their hands. They were each given a small slip of paper and wrote down details of their illness. Then the service began. A "preacher" sat at the front of the room and started to talk about his spiritual philosophy. After a few moments, the

surgeon's helpers selected the first "patient" and led him into another room.

The surgeon was a young man in his mid thirties, dressed in a white shirt and jeans. He was standing by a large couch that held a tray of surgical instruments (including scalpels, syringes, needles, and scissors). The patient was shown into the room and asked to sit on a chair next to the couch. The surgeon picked up the syringe and started to prod its needle into the back of the patient's neck. A few moments later spots of blood started to appear. The surgeon placed a piece of cotton wool over the wound, secured it with surgical tape, and asked the patient to lay on the couch. He picked up a scalpel and made an incision into his abdomen. It was a shallow but *real* cut.[1] The surgeon picked up some scissors and placed them into the wound. Blood emerged from the cut. The scissors were removed and the surgeon pushed the two sides of the cut tightly together, secured some cotton wool over it, and sent the patient to the post-operation area—a duvet spread out in one corner of the room.

I observed about five of these "operations," and they all followed roughly the same pattern. The surgeon didn't wash his hands or instruments between patients, and there was an obvious risk of his transmitting blood disorders from one patient to another. That night the surgeon operated on approximately fifteen people. The following night more operations were carried out—only this time the medical dangers were greatly increased because several of the patients were apparently HIV positive.[2]

The psychic surgeon had operated on about forty patients before the alarm was raised. The library was contacted, and it quickly canceled the remainder of the scheduled meetings. The police also received an anonymous phone call from one of the patients who claimed that the surgeon had operated without her consent. Unfortunately, the surgeon had left the country and was heading on to France (the next stage of his world tour) before any legal proceedings could be initiated against him.

Psychic Readers

More recently, we (both authors) were asked to help make an investigative documentary about exploitative psychic readers for British television. The project sounded interesting, and we agreed to participate. After several meetings with the program's producers, we decided to help set up an undercover "sting" operation. Basically, we would send two actresses to several "psychic" readers. Each actress would say that she had recently experienced a great deal of bad luck in her life (including, for example, family bereavements, problems at work and with boyfriends) and was eager for help. The psychics would be unaware that these problems were completely fictitious and, perhaps more important, that the actresses were fitted with hidden cameras that would film each of the consultations.

We chose five London-based psychics from advertisements in various newspapers (e.g., *Eastern Eye*, *Ms. London*), focusing on those that claimed to be able to remove curses. We thought that one or two might try to exploit their seemingly vulnerable clients—however, nothing had prepared us for what we were about to encounter.

First up was Psychic A, a male, who operates from a cosmetics and hair products shop in North London. The actress claimed that she had just split up with her boyfriend. Psychic A assured her that he could help and went on to recommend that the actress buy some white underwear and return in a couple of days for an herbal bath. This would "loosen her up" and bring her boyfriend back to her. The cost of this "treatment" would be £450 (roughly $720 by current exchange rates). After the consultation, the actress remarked that she had felt very unsettled by the implicitly sexual nature of certain comments made by Psychic A.

The same actress then visited Psychic B (a female). This time, the actress claimed that she had always had a difficult relationship with her sister, and that matters had recently been made worse by the death of their mother. Psychic B informed the actress that her sister was jealous of her, was trying to drive her boyfriend away, and "doesn't care how far she goes to destroy your future." Psychic B had a solution to this problem. She said her client should burn five candles, at £150 each, telling her, "[Your sister] will in the end give you the things that belong to you and let you lead your own life," if she did so. Psychic B also stressed that her client must not tell anybody about the consultation, because "if you do say something about it, then the work that we will have to do is just going to be for no reason; it's just going to collapse in front of us, and you will not have anyone else to help you through this."

. . . all five 'psychics' appeared to be more concerned with emptying wallets than giving comfort to apparently distressed people.

Our actress next consulted with Psychic C. He told his client that her bad luck was due to her planets' being misaligned, that only he could realign them. When he had finished his work, he said, her spell of misfortune would end. "[Y]our purpose of coming here will be fulfilled. You will have future children, and be able to meet your mother. Your health is not good; that will be okay. Your future will be okay." Psychic C then informed his client that this service would cost her £630.

Our second actress was first sent to Psychic D and was asked to say that she had been experiencing a great many problems with both her boyfriend and sister. Psychic D said that she should be able to get her boyfriend back because "he is destined in your life lines, which means he was supposed to be with you

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all the time." She then went on to talk about the problem of the sister, noting "she wants your life to be empty and desolate. She wants your life to be worth nothing. Your hopes and dreams must be shattered, for you to be like a beggar on the street. . . ." Psychic D then told her client the bad news—her sister had been to a "spiritual worker" (i.e., another psychic) and had a curse put on her. Next came the good news—Psychic D thought that she might be able to lift this curse by lighting various candles. This would cost around £900.

Finally, we sent our second actress to see Psychic E and asked her to tell him the story of her errant boyfriend. Psychic E said that the boyfriend could be brought back by using a number of different creams and lotions. These were available for £450.

A number of common themes run through the psychics' consultations. First, none of them offered any form of mainstream counseling or even suggested that their obviously distressed client (during three of the consultations the actresses feigned tears) seek out professional help. Second, several of the psychics were eager to convince their client that her run of bad luck was due to a curse put on her by a seemingly close friend or family member. Third, many of them tried to distance the client from any possible social support, often asking her not to mention the consultation to friends or family. Fourth, and perhaps most worrying of all, each and every psychic suggested that they alone could solve the client's problem, and asked between £450 and £900 for their services. We were appalled at the way in which all five "psychics" were prepared to act in such an unethical way and appeared to be more concerned with *emptying wallets than giving comfort to apparently distressed* people.

One could perhaps argue that such behavior might be excusable if these people really were psychic. However, our project inadvertently resulted in some data that strongly suggests this is not the case. None of the five "psychics" were able to use their "supernatural" powers to detect that their clients were actresses or that they were being secretly filmed for a television program that intended to expose their shoddy behavior!

Conclusion

For many people, these psychic surgeons and psychic readers appear to offer quick and easy solutions to their personal problems. However, the individuals that we investigated only exploited the vulnerable and offered services that were more likely to confound, rather than assist, clients' difficulties.

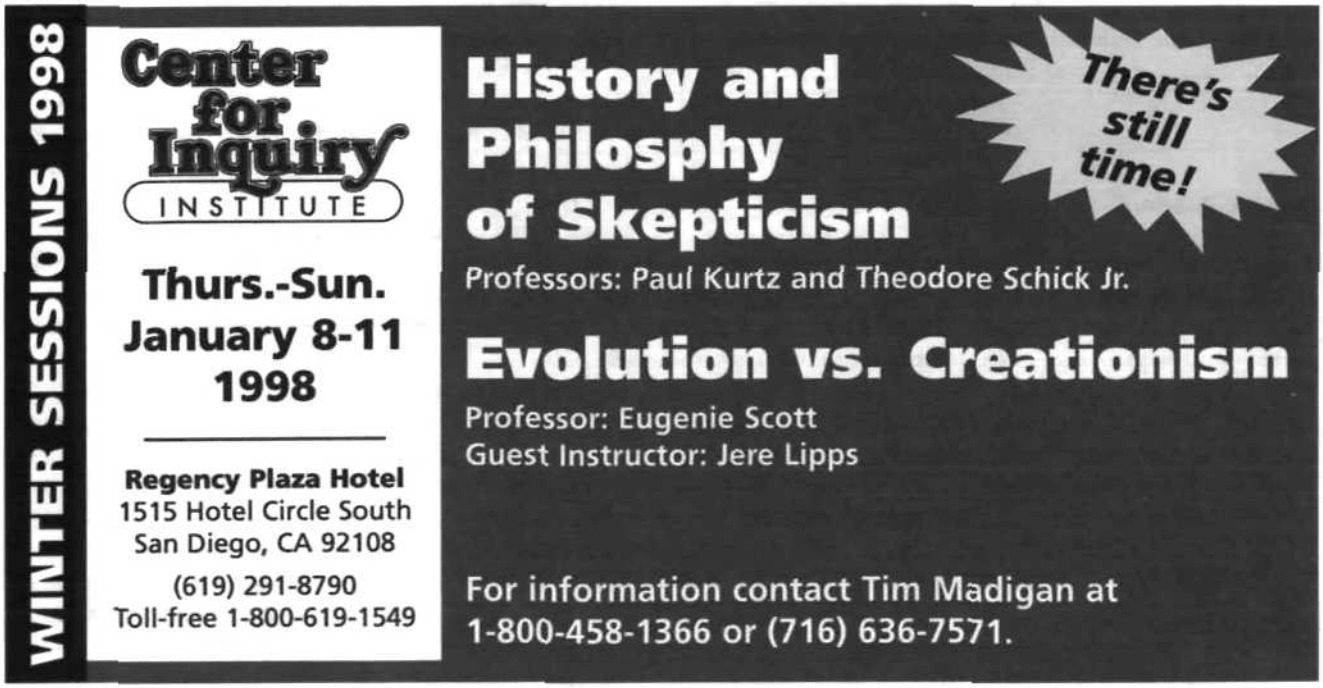
It is difficult to know how widespread such problems are, in part because many people may not go to the police after being the victim of a psychic scam, as they feel ashamed and stupid.

Perhaps most worrying of all, there are no official bodies in Britain that deal specifically with these problems, and it often falls to individuals to pick up the pieces and try to prevent further incidents.

Notes

1. Originally, I thought the surgery might have been faked, and so observed the proceedings very closely. I have worked as a professional close-up magician and had some idea of what to look for. I could see no signs of trickery, and none of the magicians to whom I have shown a videotape of the proceedings has suggested that it might have been faked. It is perhaps worth noting that, unlike other psychic surgery, this performance only involved small amounts of blood, caused by needle pricks and light incisions.

2. Readers may be wondering why I did not stop these events. The legal position here is difficult. People are free to hold religious meetings, and an attempt to prevent them from doing so could be seen as an offense. In addition, *the police can only intervene if someone reports a crime. In this case, I* was not certain that a crime was being committed, given that people knew what was happening and had consented to being "operated" on. However, the following day I informed the library of the events taking place, and the police received a complaint from a patient. As a result, the library canceled the surgeon's other meetings that had been scheduled for later in the week. □



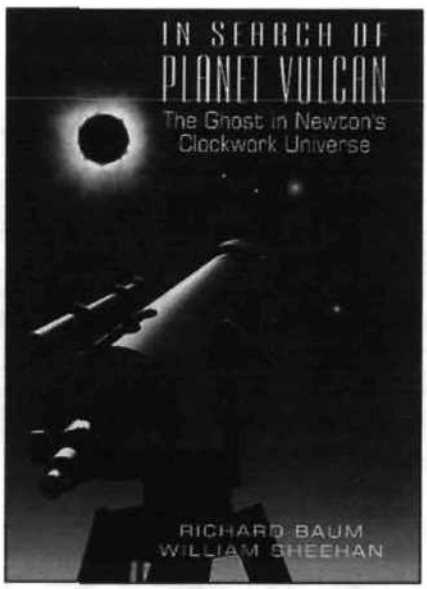
The Ghost Planet

TERENCE HINES

In Search of Planet Vulcan: The Ghost in Newton's Clockwork Universe. By Richard Baum and William Sheehan. Plenum Trade, New York. 1997. ISBN 0-306-45567-6. 310 pp. Hardcover, $28.95.

The planet Vulcan? Hey, wasn't that just a made-up planet Gene Roddenberry created for *Star Trek*? Not at all, gentle reader. For a period of many years in the late nineteenth century, some, if not all, of the world's astronomer's believed in the existence of a planet Vulcan that orbited the Sun inside the orbit of Mercury. Vulcan was actually "observed" quite a few times through the telescope by both professional and amateur astronomers. But, Vulcan never really did exist. It was a theoretical construct created to solve a problem in planetary dynamics that never would be solved by the then-standard Newtonian model of planetary motion. The story, with its fascinating twists and turns, the fleeting and ambiguous sightings of Vulcan, and the lengths to which supporters of Vulcan's existence went to explain away the lack of evidence make this story of interest to skeptics.

The story actually starts in 1781 with the discovery by William Herschel of the planet Uranus. It soon became clear to astronomers that Uranus was behaving badly—it wasn't moving along the orbit predicted for it by Newtonian physics. What could be the matter? Was Newton wrong? Impossible! If Newton wasn't wrong, then he had to be right, and something else had to be causing the odd orbit of Uranus—something doing so in obedience to Newton's laws. The obvious answer was that there was another planet beyond Uranus, the gravitational influence of which was causing Uranus to orbit as it did.



Finding this hypothetical planet was a huge challenge. In the early 1840s, two mathematicians, John C. Adams of England and Urbain Jean Joseph LeVerrier of France (shown above on a 1958 French postage stamp—England has never so honored Adams), both started working on the problem independently. It was incredibly complex, for it required taking into account the gravitational influences of the Moon, the Sun, and the known planets on the orbit of Uranus and then using the nature of the unexplained Uranian movement to predict the orbit of the new planet.

Adams and LeVerrier solved the problem almost simultaneously. On September 23, 1846, German astronomers in Berlin, using LeVerrier's predictions (Adams had been somewhat shy about publishing his work) discovered Neptune.

The discovery was hailed, quite properly, as a great victory for Newtonian theory. LeVerrier and Adams went on to great fame. The discovery of Neptune was, it should be noted, a great embarrassment to astrology, which had never even hinted at the existence of such a planet. The same was true of the earlier discovery of Uranus and the later discovery of Pluto. Not to be phased, however, astrologers attributed influences to the planets following their discoveries. Linda Goodman, in her 1968 *Love Signs,* stated that planets have no astrological effects until discovered by astronomers!

Impressive as the discovery of Neptune was, another challenge to the Newtonian view of the solar system remained. Mercury was also orbiting in a fashion that was not predicted by Newton's laws. It was natural to try the same approach to the problem of

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Mercury's orbit as had been applied so successfully to the case of Uranus. And try LeVerrier did. He spent much time and effort throughout the rest of his productive life calculating where the planet Vulcan, interior to Mercury's orbit, should be. He was occasionally buoyed by supposed reports of sightings of Vulcan where the calculations, sort of, said it should be.

LeVerrier died in 1877 and so never knew the solution to the mystery of Mercury's orbit. It's orbital deviations were shown by Einstein in 1915 to be due to relativistic effects of the Sun's huge mass bending space-time. These effects are utterly trivial for planets further away from the Sun.

The authors trace the entire story of Vulcan from the time of Herschel to the resolution of the problem by Einstein. They cover some of the same ground as Grosser did in his wonderful 1962 *Discovery of Neptune* but add substantially to the post–1846 events. They include much on the personalities (often, but not always, charmingly eccentric) of the major players in the story and the difficulties of doing astronomical observation in, say, the South Seas or American Indian Territory in the late 1800s. It is an exciting and adventurous scientific mystery, very well told.

Skeptics will be especially interested to note that while Vulcan was abandoned by astronomers by the early twentieth century, astrologers, no doubt stung by being caught out when Uranus, Neptune, and Pluto were discovered, have refused to give up on Vulcan. Thus, Goodman, again in her 1968 *Love Signs,* assigned astrological influence to Vulcan, calling it the "true ruler of Virgo" and stating that it "will become visible through telescopes in a few years." □

Snow Job in the Himalayas

JOE SZIMHART

Snowboarding to Nirvana. By Frederick Lenz. St. Martin's Press, 175 Fifth Avenue, New York. 1997. ISBN 0-312-15293-0. 225 pp. $16.95.

When this book was released, I had no idea that Frederick Lenz had contracted with St. Martin's Press to write a series of books about his life as a New Age snowboarder. *Snowboarding to Nirvana* is the sequel to the author's first "novel," *Surfing the Himalayas* (1995), in which Lenz fictionalizes a "series of experiences" that he claims to have had.

Snowboarding continues where *Surfing* left off—the young Lenz continues in Nepal to engage his guru, Master Fwap, who represents a mysterious Tantric Buddhist order. Fwap is a character in the neo-occult tradition of spiritual-adventure novels popularized by Carlos Castaneda. Fwap is to Lenz what don Juan is to Castaneda—a literary creation who may or may not represent actual shamans whom the author may or may not have actually met. In both cases, the mystical masters are fantastic alter egos of the authors, who seem to delight in fooling some of the people (their devotees) all of the time.

Although I have read dozens of books in this genre, it is not something I do for enlightenment. My job requires it. With that in mind, you might understand why I chose a trans-Atlantic trip to read *Snowboarding* and annotate it on empty back pages, as is my habit. I finished this task in four hours or less and fell asleep. I may have had a dream that all of Lenz's devotees left him out of sheer embarrassment after they read *Snowboarding.* If you follow Lenz's logic in his books, dreams can come true.

In the story, young Lenz is snowboarding alone again in Nepal at "extreme" heights (14,000 to 19,000 feet) when he hears a strange "voice" speak to him about hidden "dimensions." We later learn that this voice was from another magical teacher, the Oracle, whom Fwap introduces to our intrepid trekker. Seers among Tibetans are sometimes called *oracles.* Throughout the story, Fwap and the Oracle guide their student into new insights and experiences, especially at the Oracle's Thunderbolt Monastery hidden deep in the "Anapurna [*sic*] Himalayas." They give Lenz a *Handbook for Enlightenment,* conveniently written in English. Passages from the handbook are interspersed throughout *Snowboarding,* shaded in gray for easy reference. The Oracle and Fwap have an uncanny resemblance to the shamanic duo of don Genaro and don Juan of the Castaneda series in their capricious manner of teaching. They often laugh at their befuddled student after playing tricks on him. They also offer premonitions of whom and what the young Lenz will encounter next. And, of course, it all happens as they predict.

Lenz reiterates some of the insights he gained in the first book—he and his snowboard are one (p. 15), enlightened masters are funny and have brilliant auras (Oracle glows "electric azure blue" on p. 28), and Earth's crowded humanity has psychically polluted the astral planes, thus making it difficult to meditate (pp. 32 and 214). Meditation is the key to enlightenment, and Lenz's peculiar meditation views are spelled out in the second chapter of the *Handbook:* meditate twice daily without fail and connect with your "Tantric root guru" (pp. 85–86)—for Lenz devotees, that means him. The prescribed meditation technique is replete with hypnotic inductions that can create suggestible states in the practitioner. The detailed instructions guide the meditator to visualize (a rose, the ocean, joy) through guided imagery, to breath, to imagine, and to use yantras (sacred pictures or objects) and mantras. Lenz suggests the traditional Buddhist mantra, *OM* [*sic*] *mani padme hum.* The *Handbook* resem-

bles lectures given by Lenz in which he fuses and confuses Buddhism with New Age pop spirituality.

Early in the story, Fwap and the Oracle predict that Lenz will meet a woman who will teach him something he needs to learn. Then they laugh at him, somewhat leerily. They also inform him that he is a *tulku:* ". . . an advanced soul that has practiced yoga and meditation in many former lives" (p. 33). Fwap informs Lenz that he has attained enlightenment "many times" but needs to "regain" it in this one as a tulku. Now *tulku,* according to my dictionary, is Tibetan Buddhist parlance for "a person who, after certain tests, is recognized as the reincarnation of a previously deceased person" (*Encyclopedia of Eastern Philosophy and Religion,* Shambhala, 1989). The most famous tulku today is the Dalai Lama, who was chosen *after certain tests* as a child as the incarnation of a previous lama of the Tibetan Gelukpa tradition. "Tulku" Lenz has no objective references outside of his book that he was tested by legitimate monks in any way. But he gives us a key as to why: "The Oracle and I [Fwap], and other enlightened masters, are generally ignored" (p. 149). Later, Fwap predicts that when our snowboarder begins to preach in America, ". . . most of the people there [in the West] will think that you are a charlatan" (p. 203). Hello! The oldest trick in the book by charlatans is to complain that people will call them one. It is a defensive way to disarm a suspicious person. This transparent technique does not work well here.

Lenz comes off defensively in places throughout his story. From the first pages, he seems to believe that he must respond to criticisms of his first novel, *Surfing.* In fact, I had a suspicion as I read *Snowboarding* that he had read my critique (*SI,* July/August 1996) and took it seriously. Lenz explains in his introduction that he took the liberty to alter distances and time periods, but maintains that the "accounts . . . are based on real-life occurrences" (p. xii). That much is understandable—authors have a right to embellish or restrict a story—but in many instances within the story, he goes on at length to retort to criticisms. Lenz makes a point of explaining that he snowboarded at altitudes of 14,000 to 19,000 feet, when he seemed to claim in *Surfing* that he was as high as 24,000 feet. He no longer mentions a "yak-drawn cart" because, as some critics pointed out, yaks do not live at low altitudes around Katmandu. Perhaps he meant a water buffalo—I saw those around Katmandu, but no yaks.

In one peculiar passage, Lenz lectures Fwap about the history, techniques, and development of snowboarding. Fwap seems content to listen politely to his student brag about his knowledge of snowboards and his snowboarding accomplishments: "I'm into extreme vertical and off-piste boarding. I like to ride alone. . . ." (p. 76). Read: no one ever sees Lenz perform "extreme" boarding. He does not answer the criticism that he could hardly have been using a snowboard during the time sequence of his first novel.

In another chapter, Fwap discourses about the "second attention" (a Castaneda/don Juan concept that corresponds to psychic intuition and power). The second attention is enhanced during "power" moments at sunrise and sunset according to both don Juan and Fwap. It helps to use the second attention to gain consciousness of the "half-life of time." This is Fwap's teaching about "the awareness that time doesn't have either mass or energy . . . it doesn't really exist at all. . . . Nothing is ever born, nothing grows, nothing matures, and nothing decays or dies, nor is anything really reborn. . . . The self itself is an illusion" (p. 209). Although Buddhist philosophy bears out these pithy comments by Fwap, in the context of *Snowboarding* the statements are meaningless. Lenz misrepresents the cultures that give Buddhism meaning or validity, much as Castaneda does with Mexican Indian shamanism.

Fwap and the Oracle welcome their prodigal student with new, more powerful teachings. Lenz is introduced to "skyboarding" in a higher dimension after learning a most powerful mantra. "Phat! Phat! Phat! Phat!" chant the masters to "clear" the atmosphere of astral interference—all that people-pollution I mentioned before, and nasty astral beings who attack meditators. The masters tell Lenz that "Phat! . . . when uttered loudly by a person with occult power," causes destructive beings and forces "to flee. . . . Always use 'Phat!' when you find yourself in an impure or aurically negative physical location. . . . [It] can purify astral spaces" (pp. 181–182). At the Oracle's retreat, the three meditate on "Blue Sky" and proceed to "skyboard" through colored dimensions until they reach the violet one. "The air in this dimension was textured with what looked like some kind of undecipherable hieroglyphic writing. Beings like huge American Indians began flying past us . . . [they] didn't seem to be aware of the three of us" (p. 179).

There are some occult happenings, like the psychic teleportation of three human beings, a snowboard, and backpack at the end of this sequel that I won't go into. The key passages of this book are on pages 202 and 203. Lenz tells us through his alter ego, Fwap, that he must gain his Ph.D. and become "wealthy and famous" because the West will only "bother to listen to what you have to say about enlightenment" after that occurs. If Lenz has a purpose, it is to convince us, not necessarily to prove to us, that he is a misunderstood mystic in a universe that is conspiring to thwart his mission.

But what about his wealth and fame? It became clear to the general public who saw an exposé on Lenz by *Dateline* (NBC TV, August 1996) that Lenz gains most of his "wealth" by convincing a core group of devotees to find high-paying computer industry jobs, sell soft-

Joe Szimhart is a specialist in controversial new religions, therapies, and cults. He reviewed Surfing the Himalayas *in our July/August 1996 issue.*

ware for his businesses, and "donate" thousands of dollars a month each to support his mission. One wonders where the young Lenz in the books gets his money to travel, snowboard, and hang out in exotic places. He does not talk about work. Try *mind control.* Lenz has managed to influence dozens of intelligent, young "students" to believe in him and support him in a way that could only make mind control enthusiasts, like the Central Intelligence Agency, wonder.

On my return from Paris—the trans-Atlantic trip mentioned earlier—I reread *The Search for the "Manchurian Candidate": The CIA and Mind Control,* by John Marks (Dell, 1988), for another project. This book took me longer to finish than *Snowboarding,* as it is dense with useful information and interesting facts. It occurred to me that, as flawed and silly (and dangerous) as much of the CIA experimentation on "mind control" was, the government's search for a method to "control" the thoughts and behaviors of a deployable agent turned up only one undeniable fact: "By the time the MKULTRA program ended in 1963, Agency researchers had found no foolproof way to brainwash another person" (Marks, p. 154).

The best agents, it seems, are those who exhibit deep devotion to the cause and a willingness to avoid doubts about their mission. "Brainwashing" worked best when it mimicked "religious conversion" (Marks, p. 138), and the Chinese had the most effective system to accomplish this, if only temporarily, with their targets. They relied mostly on "group pressure, ideology, and repetition" (Marks, p. 139). Fwap asks for as much from Lenz, who complies with the pressure from his masters, absorbs the ideology irrationally, and follows the meditation rituals repeatedly. And if you read the *Handbook,* you can surmise what Lenz might ask of his students.

As for "fame," Lenz reportedly advertises himself and his projects with the "donations" from devotees. One might say that he is a self-made man. But is he enlightened, as he claims, in a Buddhist sense? *Phat* chance he is not. "Phat" is inner city jargon for "cool" or "great" or "excellent," depending when and where you lived your life as a youth. Maybe "Master Fwap" has appropriated a trendy Western word in an effort to impress trendy Western readers. Out of curiosity, I interviewed a Tibetan national at Project Tibet in Santa Fe, New Mexico. He never heard of "Phat," and it means nothing to him in his native language. □

NEW BOOKS

The Courage to Become: The Virtues of Humanism. **Paul Kurtz.** Praeger Publishers, 88 Post Road West, Westport, CT 06881. 1-800-225-5800. 1997. ISBN 0-275-96016-1. 138 pp. Softcover, $12.95. An extended essay explicating the basic moral virtues of humanism. Emphasizes three pivotal moral virtues or excellences: courage—to persevere and overcome; cognition—critical thinking and ethical rationality; and caring—compassion and benevolence. These, says the author, a noted philosopher, humanist leader, and founder of CSICOP, are related to the entire constellation of virtues (both the common moral decencies that apply to relationships and the virtues that humanists advocate in their own personal lives) and are perhaps foundational to them.

Critical Thinking for Social Workers. **Leonard Gibbs and Eileen Gambrill.** Pine Forage Press, 2455 Teller Road, Thousand Oaks, CA 91320. 1996. ISBN 0-8039-9050-2. 246 pp. Softcover, $31.95. Workbook for social workers has, in the authors' words, a single purpose: "that those who do its exercises will reason more effectively about life-affecting practice decisions." As they say, critical thinking is essential to helping people because it encourages practitioners to evaluate the soundness of beliefs, arguments, and claims. Includes sections on why critical thinking is important, recognizing propaganda in human-service advertising, fallacies and pitfalls in professional decision making, and thinking critically about specific assessment and intervention decisions.

The End of the World as We Know It. **Daniel Wojcik.** New York University Press, 70 Washington Square South, New York, NY 10012-1091. 1997. ISBN 0-8147-9283-9. 281 pp. Hardcover, $30. Professor of English and folklore at the University of Oregon examines the doomsday scenarios and apocalyptic predictions of visionaries, televangelists, survivalists, and various other endtimes enthusiasts, as well as popular culture, film, music, fashion, and humor. He suggests a framework for understanding various expressions of apocalyptic belief in the United States today and offers reasons for the prevalence and enduring appeal of such ideas. The emphasis is on "folk" or "popular" grassroots belief rather than ideas promoted by organizations or institutions.

Guidelines for Extrasensory Perception Research. **Julie Milton and Richard Wiseman.** University of Hertfordshire Press, University of Hertfordshire, College Lane, Hatfield Herts AL10 9AB, UK. 1997. ISBN 0-900458-74-7. 94 pp. Softcover, £12.45. A handy manual of guidelines to help experimenters and evaluators make informed choices in the design, reporting, and assessment of ESP experiments. Chapters deal with basic experimental designs in ESP research, pre-specification of tests, methods and testing of randomization, sensory shielding (before, during, and after the trials), judging, recording and checking calculations, and reporting and retaining data. This is the second title in a series. The first was *Guidelines for Testing Psychic Claimants* by Richard Wiseman and Robert Morris.

Psychology Astray. **Harrison C. Pope, Jr., M.D.** Upton Books, P.O. Box 2348, Boca Raton, FL 33427. 1997. ISBN 0-89777-149-4. 129 pp. Softcover, $12.95. Social Science Resources Series. Nineteen short essays on fallacies in studies of "repressed memories" and childhood trauma. Divided into two parts: *Can individuals "repress" memories of traumatic events? Does childhood sexual abuse cause adult psychiatric disorders?*

—Kendrick Frazier

Corben, Herbert C. Book Review. *Journal of the History of the Behavioral Sciences* 33 (2): 187–191, Spring 1997. Critical review of David J. Hess's *Science in the New Age: The Paranormal, Its Defenders and Debunkers, and American Culture,* which attempted to define and describe how New Agers, parapsychologists, and skeptics (represented by CSICOP) define the boundaries between and within them. Concludes that Hess overemphasizes the similarities among the three groups, since the first two often distort science and make unjustified claims. Hess follows with a response saying Corben fails to understand what constitutes cultural studies today.

Edwards, Tamala M. "Sleights of Silicone." *Time,* September 1, 1997, p. 64. Report on the legal wrangling over breast implants says the dispute may test the ability of science to stand up in court.

French, Christopher C., Anthony Leadbetter, and Geoffrey Dean. "The Astrology of Time Twins: A Re-Analysis." *Journal of Scientific Exploration* 11 (2): 147–155, 1997. Examination of a test reported in 1994 that could seem to provide some support for astrology. The 1994 paper tested the claim that persons born close together in time are more alike than those born far apart. French, Leadbetter, and Dean examined the correlations, found that the results are in the wrong direction and that there are other problems, and conclude that an astrological interpretation of the results is unwarranted.

Hansson, Sven Ove. "Defining Pseudo-Science." *Philosophia Naturalis* 33: 169–176, 1996. Essay on how to define pseudoscience and demarcate it from science and nonscience.

Hitchens, Christopher. "Fairy Tales Can Come True . . ." *Vanity Fair,* October 1997, pp. 204–210. Feature article inspired by the new movie about the Cottlingly Fairies photographs treats the case correctly as a hoax and fairies as the mythological fetish of the moment.

Kelly, I. W. "Modern Astrology: A Critique." *Psychological Reports* 81: 1035–1066, 1997. Major scholarly critique of astrology, an expanded version of the author's paper at the First World Skeptics Congress: Science in the Age of (Mis)Information. Concludes that astrology as presently practiced has no relevance to understanding ourselves or our place in the cosmos. "Modern advocates of astrology cannot account for the underlying basis of astrology associations with terrestrial affairs, have no plausible explanation for its claims, and have not contributed anything of value to the cognitive sciences."

Milstone, Carol. "Sybil Minds." *Saturday Night,* September 1997, pp. 35–42. Investigative article about the increasingly popular diagnosis of multiple personality disorder shows that many experts say it's a sham that ruins people's lives.

Polidoro, Massimo, and Luigi Garlaschelli. "Spirit Moulds: A Practical Experiment." *Journal of the Society for Psychical Research* 62 (848): 58–62, July 1997. Spiritualists and mediums have long produced paraffin-wax molds that were supposedly modeled around materialized "spirit hands" during séances. They alleged that only the dematerialization of a hand could account for the empty paraffin molds. The authors carried out experiments, which everyone can repeat at home, disproving the claim of the impossibility of removing a hand from a thin paraffin mold without breaking it and refuting the claims that a hand cannot be removed from a mold that has been given strange shapes (clasped fingers, a fist hand, V-shaped fingers).

"The Power of Magic." *New Scientist,* September 27, 1997, p. 3. Editorial responds to recent assertions about homeopathy by its proponents and says the appeal of homeopathy to its mystically inclined patients is "magic and mystery," so using science to try to prove homeopathy works will destroy the essence of its appeal.

Whitney, Craig R. "Physicists Take Philosophes to Task in Paris Book." *New York Times,* October 4, 1997. Excellent article from Paris on the dispute between the critics and defenders of French postmodern philosophizing, keyed to publication in Paris of *Intellectual Impostures,* by American physicist Alan Sokal (of the recent hoax in this area) and Belgian colleague Jean Bricmont. The book's authors argue that several revered French postmodern philosophers just don't know what they are talking about when they try to use scientific and mathematical concepts. They refer to the postmodern philosophizing as "true intoxication by words, combined with complete indifference to what they mean."

—Kendrick Frazier

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Alternative Medicine in a Scientific World

Thank you for an outstanding special issue (September/October 1997) regarding "alternative medicine." The proliferation of specious health claims is both expensive and threatening, both to myself as a disabled person on a fixed income and to all our fellow world citizens. Health fraud is costing us billions and billions (sorry, couldn't resist) of dollars annually. In addition, resorting to "complementary therapies" is expensive in another currency—that of wellness and comfort—when, as so often is the case, these "therapies" are harmful.

Perusing the local newspaper, I come across a bit of prattle that advances the pretense of a practice called "iridology," wherein "practitioners" with absolutely no medical training attempt to discover disease, or at least a predilection towards disease, in people through examination of their irises. The article is almost wholly devoid of critical challenge—one physician is reported to have remarked "that's baloney."

Earlier in the month, the same newspaper (the Syracuse, N.Y., *Post-Standard*) printed a response of mine to an earlier letter by a local chiropractor, in which the chiropractor laid claim to an academic preparation equal to that of any medical school graduate. Being a radiographer and a registered professional nurse with thirty-three years of experience, I begged to differ. My letter was followed by another, allegedly by a different chiropractor, that not only insists that "chiropractors can diagnose any ailment," but that any chiropractic college trains its graduates in areas from "proctology to neurology, clinical psychology to histopathology, physical therapy, gynecology, pediatrics, X-ray physics, neurophysiology, MRI interpretation, endocrinology, etc." My, my, I thought, my own internist would love to be able to make such a claim! My rebuttal continues to be ignored by the newspaper.

Coincident with this exchange was a segment on ABC television's national evening news in which it was claimed that many of the nation's HMOs and other insurers are now paying for "alternative therapies," including acupuncture, aromatherapy, and even guided imagery. And we wonder why the cost of health care, especially in the United States, keeps escalating beyond all reason! This remark was included: "You may be surprised at what your HMO is willing to pay for." That's not quite true. *Outraged* is a more appropriate term to describe my feelings. Folks, you and I cannot afford to pay for, through increased insurance premiums, unproven therapies, whether we access health care through an HMO, other private insurance, Medicare, or the Veterans Administration health system. . . .

Friends and editors, please, PLEASE keep it up! Keep pointing out that not only hath the emperor no clothes, but that this wildly proliferating "alternative" health industry is costing us all untold dollars, and almost unimaginable suffering as well. Would that I had the outlet, and the income to support myself, that I could undertake such investigative reporting. But I don't. I and my fellows must depend upon folks like you at CSICOP. Keep on kicking butt and taking names!

William D. Mayers, R.T., R.N.
Canastota, N.Y.

There are so many areas in alternative medicine that you could have explored, but you did not. You could have looked at the limits of traditional medicine and why some people are forced into seeking alternative cures. You could have looked at the roles insurance companies and the government play to drive people out of traditional medicine. You could have explored the fear of radical cutting of the surgeon's knife, but this, too, was overlooked. And there are many other areas that could have been explored but were left out. I think any attempt to understand why people seek alternative cures must include a look at the institutions we have created and why they are not meeting the needs of all the people who try to use them. If you would have presented a few reasons why people are seeking an alternative cure, I think I would have had food for thought.

Rod Herrick
Camanillo, Calif.

There is a fundamental flaw in the scientific method and its application in the practice of medicine. Scientific statistical validity, by definition, applies to populations. In medical practice, treatments validated under controlled, blinded conditions are applied to *individuals* under conditions that are not blinded, and subjective patient and physician factors are free to play. The art of medicine is the individualization of treatment, and each stage of a treatment algorithm depends on the knowledge, experience, integrity, technical skill, intelligence, conscientiousness, imagination, intuition, etc., of the individual doctor.

Initiating or continuing a treatment is a matter of judgment; a doctor using an unproven treatment is in the same position as conventional practitioners who have to decide whether a given treatment is actually working for an individual. In practice, therefore, "alternative medicine" practitioners are on equal scientific grounds as conventional doctors as long as they limit themselves to safe treatments that afford clearcut changes in disease manifestations. To paraphrase William Osler, "If what your doing is working, keep doing it!" In the real world of medical practice, a patient has to be his or her own control.

There are many ways in which conventional medical practice is unscientific due to subjective physician factors. How many carotid endarterectomies are done by surgeons who can't demonstrate the high degree of surgical skill required by published criteria to justify the risk/benefit ratio of the procedure? How many other surgeries are done for reasons that would not stand up to peer review? Far more damage to the public health is done by unscientific conventional medicine than by unscientific alternative medicine.

Charles H. Bagley, M.D.
Great Neck, N.Y.

Congratulations on the wonderful issue focusing on alternative medicine. The articles were clear and accurate. But I do believe that the estimate for the amount of money wasted on quackery (you say $14 billion) is grossly understated. In 1984, the Select Committee on Aging of the House of Representatives published a report (*Quackery, a $10 Billion Scandal*) and this was only for spending by senior citizens. My sources and experience with health fraud lead to a conservative estimate of over $40 billion per year spent on worthless or, at worst, dangerous and deadly, alternative therapies.

I have also found that quacks are not

necessarily any more sympathetic, kinder, more reasonable, or less painful, than conventional doctors. Indeed, a recent news story tells of a quack who was injecting a mixture of household cleaning products, including bleach, into his trusting victims, causing severe pain. Yet these victims returned again and again for his services. What the quacks offer is the promise of a cure, and that is the lie that can often overwhelm the patient's rational thought process.

John E. Dodes, D.D.S.
President, N.Y. Chapter
National Council Against
Health Fraud
Woodhaven, N.Y.

With regard to homeopathy, I have always wondered, since homeopaths believe that the effects of substances hold even after extreme dilution, how can they believe that the water or alcohol used as the diluting agent can ever be "pure" and free from whatever "bad substances" it has encountered during its existence. Furthermore, if one accepts their recent theory of "quantum memory," then how can one ever purify the diluting agents by distillation, deionization, or any other physical process. Indeed, how can water made from its component gases ever be free of contamination by unknown "badnesses" encountered as gases or even quantum particles?

Michael A. Rolenz
Redondo Beach, Calif.

I am a pharmacist and found your articles on alternative medicine and the nonscience/nonsense behind their marketing wonderful reading. I often find myself inadvertently recommending these products by having to say, "They say this product helps you sleep or this product helps you cleanse your system" to patients. Who are "they"? Pharmacists are in a good position to "Nader" the products that our employers (aka: Big Business) place on our shelves.

Terri Weisenbach, RPh.
Colorado Springs, Colo.

Editor's Note: Two new sources of critical evaluations of alternative medicine and quackery are now available: Stephen Barrett, M.D.'s "Quackwatch" Web site, http://www.quackwatch.com/, a detailed guide to health fraud, quackery, and intelligent descision making; and the new journal The Scientific Review of Alternative Medicine, *edited by Wallace Sampson, M.D., sponsored by the Council for Scientific Medicine, and published by Prometheus Books (see News & Comment article, this issue).*

William Lane Responds to Shark Cartilage Article

"Taking a Bite Out of Shark Cartilage" by Lynn McCutcheon (September/October 1997) contains some truths, a lot of misinformation, and some very uninformed statements.

I doubt if McCutcheon ever developed an alternative solution therapy, especially one related to cancer. If he had, he would understand the problems of bucking an industry and money stream that may not want a natural and inexpensive possible solution. Cancer victims or their insurance companies spend on average almost $500,000 for each cancer case, much of it after they are classified as terminal. Despite this expenditure, 60 percent of cancer victims do not live for five years. These statistics are from the yearly American Cancer Society report. We spent as a country $9.3 billion on chemotherapy in 1996, despite the fact that chemotherapy is effective only in 7 percent of cases (93 percent ineffective).

When you try to develop something alternative, funding is unavailable and you have to beg, borrow, and steal to get even the minimal studies. . . . McCutcheon questions my use of the Contreras Hospital. Actually, I was very grateful because they gave me my first human study. He wonders why I used only eight patients (all terminal and having less than six months to live). When seven of eight respond in a first study of any size, it is exciting and highly significant. Why didn't I have negative controls? As I'll explain later, they are not needed and inhuman.

McCutcheon spends a long paragraph explaining how to run a double-blind study. Possibly McCutcheon thought I did not know what a double-blind study was. He should know that with terminal, stage-4, patients you don't need negative controls because, as the FDA says, they all die, and if they don't die you have a success.

McCutcheon jumps on the Cuban trial: twenty-nine terminal patients of which only nine died of cancer. He failed to grab the significance; Mike Wallace did. With conventional treatment, all twenty-nine would have died of cancer because the definition of terminal is that they have failed all therapies, and all die generally within six months. He cited Prudden, who says they all died. Prudden was never in Cuba and certainly couldn't comment. I visited Cuba and the patients eleven times over a three-year period and saw fourteen patients completely well (not marginally alive, and they didn't have that favorite of the uninformed critics, spontaneous remission). I also received monthly reports from the oncologist on the scene until our politics made this impossible two years ago. The fact that the Cuban oncologist and his associates were trained in Russia and spoke Spanish shouldn't disqualify them either. Mike Wallace and the *60 Minutes* team visited Cuba with me four times. It wasn't what I wrote or what a peer-reviewed paper said; it was what they saw that they reported, and there were X-rays to support their positive claims. The Cuban trial was not peer reviewed, but it was Mike Wallace reviewed, and that is much tougher than any peer review. Before McCutcheon claims I can't add—nine die from cancer, six die from natural causes over four years, and fourteen are cancer free—that makes twenty-nine as of my last knowledge.

The FDA is a pretty good referee. They have now approved four human phase-2 clinical trials of which two are proceeding now (advanced nonresponsive brain and advanced nonresponsive breast). All trials are based on stage-4 patients that have failed at least two conventional therapies and are considered terminal. These are, I believe, the first ever on a whole natural supplement and one of the few trials on stage-4 patients. Conventional medicine likes to work with early stage-1 patients. Instead of criticism, why not some applause?

At a recent NIH meeting, my work was widely complimented. We are arranging to do trials with some of the best-known cancer centers, and we have tens if not hundreds of survivors. Why didn't McCutcheon interview some of the sur-

vivors rather than the PR firm for bovine cartilage and the developer of it, Prudden, whose reported results were completely refuted in the January 1996 issue of the widely read health newsletter *Alternatives*?

The first shark-cartilage product I developed was Cartilade, just like the early car Ford developed was a model T. Cars improved, and a food supplement can and did improve, and that is Benefin. I hope tomorrow it improves again. That should be good, not bad. To show that the patients noted the change for the better, the large plant that made the first product, Cartilade, is now closed and the modern plant that makes Benefin is expanding.

McCutcheon writes that the therapy is expensive. The average cost for six to eight months is $3,000 for women and $5,000 for men. (Men are generally larger and the dose suggested is therefore larger). Compared to $500,000 for conventional treatment with 60 percent deaths, who in his right mind would question cost when anecdotal data, hopefully soon-to-be-peer-reviewed results, are comparatively better? Remember, my results are on stage-4 patients, while conventional-treatment results with stage-4 patients are ZERO.

I. William Lane
Cartilage Consultants, Inc.
Short Hills, N.J.

Lynn McCutcheon responds:

I appreciated the humor in Lane's reply to my article on shark cartilage. The mere thought of TV journalists as an improvement over the peer-review system in scientific journals should evoke laughter among those readers familiar with the scientific publication process. I invite readers to make up their own jokes.

On a more serious note, Lane offers some excuses for why the previous research on shark cartilage yielded equivocal results. That's fine, but then he compares himself to Henry Ford and wonders why we applaud Ford but not him. The world withheld its applause for Ford until after *it was clear that his innovations worked. Lane seems to have forgottgen that the top-quality research needed to clearly demonstrate that his product is effective in fighting cancer has yet to be completed. If and when that day ever comes, he will get the applause he craves, and I will be among those applauding.*

Medical School Spirituality Conference

For some reason that I do not understand, Bryant Furlow ("Medical School Faith Healing: Report on a Spirituality Conference," September/October 1997) seems to want to place John Marks Templeton in a bad light. By describing Templeton as a "devout Christian" who allegedly incorporates Christian theology into the study of the life sciences, this article gives the impression that Templeton belongs in the conservative or fundamentalist wing of Christianity and is a supporter of scientific creationism—here mislabeled "biblical creationism." This simply does not describe Templeton accurately. He is a philanthropist and a philosopher. His own widely published views are really quite different from those that Furlow wishes to associate him with. Furlow certainly has a right to his opinions; but I would urge accurate depictions rather than hinting at guilt by association.

Most of the research projects that the John Templeton Foundation supports are dedicated to natural science at its best. To the extent that CSICOP supports the integrity of natural science, I would think that Templeton would look more like an ally than a foe.

I am also less than pleased by the juxtaposition of apparently quoted material that makes yours truly appear to be an advocate of scientific creationism. Furlow takes a couple of phrases from separate sections of one of my published articles and puts them together in quite a misleading fashion. In the article in question, I spend a number of pages describing some of the different ways in which science and religion are related. One of the ways has to do with establishment science. Another has to do with scientific creationism. I describe these two ways. I do not advocate either one of them. Yet Furlow seems to want to give the impression that I advocate one over against the other. I simply wonder: why? Nowhere in my writings over the last three decades have I ever defended scientific creationism.

Ted Peters
Professor of Systematic Theology
Center for Theology and the
Natural Sciences
Berkeley, Calif.

I have long thought that medical situations are a poor test of the efficacy of prayer. There is too much ambiguity arising from such factors as errors in diagnosis, subjectivity and bias in measurement of improvement, natural recovery, etc. Better would be tests of the kinds typically used by parapsychologists. In particular, one could stage a sequence of several thousand coin tosses, each determining whether a small amount (such as a dollar) would be given to CSICOP or to a group promoting prayer; members of the latter could pray, while supporters of the former could only wait and see.

Alas, I now learn (from psychiatrist Scott Walker, quoted in Bryant Furlow's "Medical School Faith Healing: Report on a Spirituality Conference") that prayers of skeptics might be answered, overriding the prayers of believers! If so, what better demonstration of the inscrutability of Divine purpose?

John G. Fletcher
Livermore, Calif.

Bryant Furlow responds:

Peters takes offense at my characterization of John Templeton as a "devout Christian" who promotes theological interpretations of the natural sciences, because of imagined implications about Templeton's ideological affiliation. Actually, the offending characterization was borrowed from positive media reports about Templeton's extensive philanthropy. Templeton's attempts to incorporate religious views into scientific thought (and to legitimate theology with vague appeals to chaos theory and quantum mechanics) are evident in his books (e.g., Evidence of Purpose: Scientists Discover the Creator*). I intended no misrepresentation of Templeton's political or sectarian beliefs. Nor do I doubt that he is a generous and well-intentioned individual. I simply wished to detail his spiritualist bias for readers, because that bias and the spending habits of the Templeton Foundation seemed relevant in discerning the real agenda behind medical school faith healing conferences. The bulk of my conference report dealt with assertions made by conference organizers and sponsored speakers. Of course, in assessing the scientific viability of faith healing—or any hypothesis—advocates' motives are not nearly as important as*

the quality of their data and reasoning.

Lest the real issue be lost in a cloud of ink, let me reiterate the central point of my conference report. There is an ongoing series of medical school conferences, funded by the John Templeton Foundation, that present faith healing as a scientifically supportable medical practice worthy of substantial government grants for empirical investigation. While the studies reported by speakers, judging from the Albuquerque conference, tend to fall short of scientific rigor, medical students nevertheless receive academic credit for attending these meetings.

I apologize for erroneously implying that since theologian Peters presents "scientific creationism" as a viable alternative to modern evolutionary theory, he may advocate creationist ideas. I hope that this misinterpretation on my part will not distract from the larger issue of whether faith healing should be part of mainstream medical education.

What Saucer Reports Tell Us

Three cheers for Robert Sheaffer's column "The Truth Is, They Never Were 'Saucers'" (September/October). Reports of flying saucers and aliens do indeed tell us more about the inner workings of the human mind than the outer workings of the external world.

In the 1950s, unidentified flying objects in science fiction movies invariably turned out to be flying saucers instead of meteors, comets, and airplanes. The least likely and most dramatic explanation came to replace the most likely and mundane, for much of the public, through yet another example of "the power of suggestion."

Rob Takaroff
Brooklyn, N.Y.

Icy Sheet Warming?

The part of C. Eugene Emery Jr.'s News and Comment article "Bending the Mind, Bending the Data?" (September/October) concerning the claim that Tibetan monks can wrap themselves in wet frigid cotton sheets without shivering, and the observation by Irwin Tessman that a wet shirt actually insulates you, brought to mind a therapy that we used in the psychiactric hospital where I worked in the early 1950s.

Many of today's drugs were not available at that time, so one of the methods we used for agitated patients consisted of wrapping the person mummy-fashion in wet, ice-cold sheets. Often there were small slivers of ice still adhering to the sheets. We did not have to worry that they were too cold; indeed, one of the problems we had to watch for was that they did not get too warm. We periodically checked their temperature for that reason.

Being one who always volunteered when the hospital wanted to see how any treatment felt (I once got into an iron lung—that tells my age, doesn't it?), I allowed myself to be wrapped up in iced sheets. Did I shiver? Nope. I was so warm and relaxed that I went to sleep, and believe me, I'm not a Tibetan monk!

Marie Micheletti, R.N.
Tremont, Ill.

Rashad Khalifa's Numerology

Thanks for running Martin Gardner's column on Rashad Khalifa's numerology (September/October). I have been attempting to explain what all of this was about to fellow skeptics and fellow Muslims for several years but did not know enough about the background to do it well. His article explained the history of the matter elegantly. . . .

As both a Muslim and a regular reader, I find your magazine ever more helpful in discovering the true wonders of how the universe runs.

Ron Hopkins-Lutz

Politics and Skepticism: Reaction to Letters

Both Barry Fagin's article "Skepticism and Politics" (May/June 1997) and the letters protesting it (September/October) failed to engage the question of what principles we may use to make decisions, both in science and in politics, about what is right and what is wrong.

In his recent book, *Kindly Inquisitors*, Jonathan Rauch proposes some basically skeptical principles for making decisions about scientific knowledge and public policy. His first principle, which he calls the skeptical rule, is: "No one gets the final say." This is exactly what the SKEPTICAL INQUIRER does—challenge claims to final knowledge in science. Rauch offers a strong apologia for what he calls "liberal science" and explores the threat of fundamentalism—i.e., nonskeptical principles—to science, society, and democracy itself.

At this time, many scientists and philosophers are proposing that our very perceptions of the world are hypotheses (see, for example, Richard Gregory, *Mirrors in Mind*, 1997)—a series of best guesses about what is going to happen—which are then tested by how well they predict events. Fagin's article attempts to elevate to the status of truth a particular hypothesis about a political agenda based on yet another hypothesis about economic decision making. It was gratifying to see it roundly rejected by the readership of *SI*.

Fagin was right about one thing: American politics needs reason and clear thinking. But ours, not his. Democracy is the great social experiment of skepticism. It calls on all of us to share our knowledge and resources, our hopes and beliefs, and our questions and doubts, to test out our hypotheses about right and wrong—both in science and politics. I would like to see more conversations in *SI* about skepticism and politics, toward a better understanding of the underlying processes of both science and public policy-making.

Caroline S. Arnold
Kent, Ohio

I do not know if an article on skepticism and libertarianism does "belong in the SKEPTICAL INQUIRER," but I am certainly not convinced by the arguments presented by the last disgruntled correspondents in your September/October issue. It appears that the skeptic's usual intellectual rigor, earnestly applied to psychic weirdos, is no longer applicable when discussing philosophy. And while even disgruntled readers are entitled to their opinions, it was obvious that many had little or no knowledge of their enemy.

I noted many false premises in the letters, but two fundamental errors stand out. First, libertarians are *not* "right-wing," nor are they "conservative." Clearly, the writers who so labeled them had not done even the most basic investigation. There are quite a few books on the subject, as

well as the Libertarian Party platform, that would easily clear up this confusion.

Second, contrary to one writer's statement, we [as a nation] have *not* "tried the libertarian approach." Never. I am at a loss to explain where this silly idea originated.

John Pollard
Virginia Beach, Va.

Your Letters to the Editor column for September/October should have been titled "Liberals Speak Out in Defense of Big Government." They are so obvious.

Why can't these people apply skepticism to their own beliefs such as socialism, collectivism, egalitarianism, environmentalism, and their right to make you and me pay for it.

I consider *SI* to be well edited. Keep it up.

Garwood Allen
Nyssa, Ore.

It was disheartening to see so much negative reaction to Barry Fagin's article "Skepticism and Politics."

At the risk of beating the issue into the ground, I wanted to reply to the readers who thought it was ironic for a government employee to be so critical of government. Perhaps it is, but I'm a retired federal employee and I share his point of view. I think Mr. Fagin is speaking from experience, having seen what the government does from the inside. I was a believer in a big, benevolent government when I began working for Uncle Sam, but twenty-eight years of service made me very skeptical of that.

I partially agree with the readers who believe the government has a role to play in the sciences. I did human resources work for a major federal research agency and I can honestly say they did important, valuable research. However, they are burdened by bureaucratic nonsense, impediments to hiring the best candidates, excessive administrative overhead, and political meddling. I didn't say what agency I worked for because it doesn't matter—they're all in the same boat. That's the way it is, and it's hardly a bargain for the taxpayers.

Victor Commisso
Potomac, Md.

Editor's Note: Once again, our intent with Fagin's article was not to debate political ideology or to endorse any ideology but to raise and discuss some general issues of skeptics' involvement in political issues.—EDITOR

The letters column is a forum for views on the matters raised in previous issues. Letters should be no more than 225 words. Due to the volume of letters, not all can be published. They should be typed double-spaced. Address: Letters to the Editor, SKEPTICAL INQUIRER, 944 Deer Dr. NE, Albuquerque, NM 87122.

MAGNETIC TREATMENT

from page 31

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200% PROBABILITY

from page 49

want to convince people that the Egyptian pyramids were built by extraterrestrials, but the conspicuous alternative that they were built by the ancient Egyptians poses a serious threat to your arguments. Erich von Däniken (1971) solves this very problem by focussing much of his discussion of the pyramids on carefully selected facts and pseudofacts that appear to be inconsistent with the hypothesis that the Egyptians themselves constructed these architectural masterpieces. The select description of the pyramids that von Däniken presents to his readers rules out the obvious explanation of their construction and leaves the reader with no accessible hypothesis other than the one he advances. Likewise, in the firewalking example I started with, care was taken to rule out some of the more obvious alternatives to the mind-over-matter hypothesis, such as the use of protective chemicals on the feet, or the fact that the coals weren't really as hot as they looked. As a result, someone unaware of the physics that governs firewalking is left with no other accessible explanation except mind-over-matter. (See Leikind and McCarthy [1985] for a simple alternative explanation involving basic principles of heat conduction and heat storage capacity.)

It is wise to consider the implications of the present work for an individual whose only intent is to convince an audience of the truth of his or her claim. Understanding what claimants can do to sway opinion their way makes it easier to identify people motivated solely towards this end. However, the most important implications are for those whose goal is to stimulate critical thinking and to come to reasoned judgments regarding presented claims. The research and ideas I have presented suggest a simple prescriptive rule for both speakers and listeners who want to combat the tendency toward overconfidence fostered by the inaccessibility of alternatives. There is probably no better way to avoid credulity and overconfidence than by periodically repeating the following koan-like declaration to yourself and your audience: "Think of all those possibilities that you just can't think of."

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The SKEPTICAL INQUIRER must be a source of authoritative, responsible scientific information and perspective. The Editor will usually send manuscripts dealing with technical or controversial matters to reviewers. The authors, however, are responsible for the accuracy of fact and perspective. It is good practice to have knowledgeable colleagues review drafts before submission. Reports of original research, especially highly technical experimental or statistical studies, are best submitted to a formal scientific journal; a nontechnical summary may be submitted to the SKEPTICAL INQUIRER. Studies based on small-scale tests or surveys of students will be considered only if they establish something new, provide a needed replication of some important earlier study, or test some new theoretical position.

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Book Reviews: Most book reviews are about 500 to 1,000 words. Both solicited and unsolicited reviews are used. Include publication data at the top of the review in this order: *Title. Author. Publisher, city. Year. ISBN. Number of pages. Hardcover or softcover (or both), price.* Include a suggested author note. If possible, include the cover of the book for illustration.

News and Comment: News articles from 250 to 1,000 words are welcome. They should involve timely events and issues and be written in interpretative journalistic style. Use third person. The news sections of *Nature, Science, New Scientist,* and *Science News* are excellent models. Balance, fairness, and perspective are important. In reporting on controversies, seek and include comment and perspective from the various opposing parties.

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